

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1980 WITH TEN YEAR REVIEW AND FORECAST

Compiled by John A. Harper



**COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OFFICE OF RESOURCES MANAGEMENT
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
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Pennsylvania Geological Survey

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OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1980 WITH TEN YEAR REVIEW AND FORECAST

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ABSTRACT

Oil production in 1980 totaled 2,940,187 barrels, 123,505 barrels more than the 2,816,682 barrels produced in 1979. Oil reserves decreased by 1 percent from 50,845,000 barrels in 1979 to 50,559,000 barrels in 1980. Leading counties for production of oil were McKean, Warren, and Venango. In 1980, secondary recovery by waterflooding in the Bradford field accounted for one third of statewide oil production. No new waterflood projects were begun during the year, but 63 waterflood wells were completed in McKean, Elk, and Forest Counties in established secondary recovery projects. Three tertiary recovery projects remained active, the Penn Grade Micellar Displacement project at Derrick City, an experimental Maraflood project at Cyclone, and a microemulsion flooding project, also at Cyclone. All of these tertiary recovery projects are in the Bradford field.

Gas production increased 1 percent from 96,313 million cubic feet in 1979 to 97,439 million cubic feet in 1980. Gas reserves, including stored recoverable gas, increased from 2,251,312 million cubic feet in 1979 to 2,316,119 million cubic feet in 1980, an increase of 3 percent.

The price of Penn Grade Crude oil was \$38.00 per barrel at the beginning of the year, dropped off to \$36.00 per barrel by September, and ended the year at the original price of \$38.00 per barrel. Gas prices were subject to Natural Gas Policy Act price ceilings. The wellhead price of a thousand cubic feet of natural gas ranged from a low of \$0.29 under old contracts to \$2.83 for stripper gas.

The total number of wells reported drilled in 1980 was 2,020, an increase of 79 wells over 1979. Total footage drilled was 5,461,275 feet, a 13 percent increase over 1979 (4,832,383 feet). The total number of oil wells reported was 777, a 3 percent increase (20 wells) over 1979. The most active counties for oil well drilling were Venango, Warren, and McKean, where 83 percent of all oil wells in the state were drilled. A total of 1,100 gas wells was reported during 1980. This was a 6 percent increase over 1979 (1,043 wells). The most active counties for gas well drilling were Indiana, Erie, Crawford, Jefferson, and Westmoreland. Eighty percent of all gas wells drilled in the state in 1980 were drilled in these five counties. Twenty-four combination oil and gas wells were re-

ported in 1980, a 300 percent increase over the 6 wells reported in 1979. Forty-two percent of these wells were drilled in Crawford County.

Exploratory drilling was up 91 percent (132 wells) in 1980 over 1979. Development drilling was up 2 percent, from 1,788 wells in 1979 to 1,824 wells in 1980.

Seismic exploration activity increased 52 percent, from 29.78 crew-months in 1979 to 45.25 crew-months in 1980. Seismic crews operated in 20 counties of Pennsylvania in 1980, and permits for seismic surveys on state-owned lands were acquired in five counties.

A ten year review and forecast indicates a gradual decline in oil reserves in the first half of the 1970's, and a gradual turn-around in the latter half. Gas reserves and total number of wells drilled increased steadily over the decade, with more emphasis being placed on shallow gas production and less on deeper production. Known major producing reservoirs included the shallow Venango and Bradford Group sandstones, the Huntersville Chert and Oriskany Sandstone horizons, and the Medina Group sandstones. Future oil and gas potential is indicated in some of the deeper, partially to wholly unevaluated horizons, and in known productive horizons in areas previously considered marginal to unsatisfactory.

INTRODUCTION

Pennsylvania oil and gas statistics reported here are based on drillers' records and location plats filed with the Oil and Gas Regulation Division of the Bureau of Topographic and Geologic Survey, the administrative and regulatory agency for the oil and gas laws. Only those wells are reported for which records and plats have been received within the year. This includes wells drilled in prior years for which records were submitted and received in 1980. It does not include 1980 wells for which records had not been submitted within the year. Oil production and reserves data and gas production and reserves data shown in Figures 1 through 7 were obtained from the Pennsylvania Oil, Gas and Minerals Association Ad Hoc Committee on oil reserves in Pennsylvania and New York, and Mr. John Boomer, Consolidated Gas Supply Corporation, respectively.

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Special thanks are extended to all of the operators and companies who released natural gas production statistics and other data.

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PRODUCTION AND RESERVES

OIL PRODUCTION

In 1980 a total of 2,940,187 barrels (bbl) of oil was produced from Upper Devonian and Lower Silurian sandstones in Pennsylvania, compared with 2,816,682 bbl of oil produced in 1979. That total includes production of oil previously classified as "Corning Grade" from the Lower Silurian Medina Group of northwestern Pennsylvania, amounting to 73,218 bbl, up 2,778 bbl from 1979. All oil produced in Pennsylvania is now designated Penn Grade Crude. Production of natural gas liquids increased 2 percent in 1980 (Figure 1).

Figure 1. Oil production in Pennsylvania, 1980

	1980	1979	% Change	Cumulative to 12/31/80
	(1,000 barrels)			
Penn Grade	2,940	2,817	+ 4	1,300,695
Natural gas liquids	58	57	+ 2	

Figure 2 shows the amount of oil production and the total number of producing wells by county. Oil production statistics for the two figures disagree because Figure 1 is based on the actual amount of oil produced, whereas Figure 2 is based on the amount of oil shipped or sold. The leading counties for oil production in 1980 were McKean, Warren, and Venango, in that order, which accounted for 81 percent of the total oil produced in Pennsylvania.

DEVELOPED OIL RESERVES

Developed reserves of oil in Pennsylvania at the end of 1980 totaled 50,559,000 bbl, a decrease of 1 percent over 1979. The counties having the greatest reserves continued to be McKean, Venango, and Warren. New reserves were added in McKean, Warren, Crawford, and Erie Counties. Reserves of natural gas liquids decreased 22 percent from 266 bbl in 1979 to 208 bbl in 1980. Reserve statistics are summarized in Figure 3.

Figure 2. Oil wells and crude oil produced in Pennsylvania in 1979 and 1980, by counties*

County	Crude oil production (barrels)		Number of producing oil wells	
	1980	1979	12/31/80	12/31/79
Allegheny	63,404	63,515	285	340
Armstrong	9,642	8,886	80	72
Beaver	4,151	5,063	65	102
Butler	69,969	67,703	1,116	1,201
Clarion	25,019	25,705	440	520
Clearfield	71	0	0	0
Crawford	69,207	67,066	94	75
Elk	13,885	15,884	182	230
Erie	3,681	3,373	34	29
Fayette	0	0	0	1
Forest	101,437	114,220	1,041	975
Greene	24,801	26,787	244	290
Indiana	1,305	2,037	18	14
Jefferson	5,088	5,130	21	29
Lawrence	98	37	2	1
McKean	881,904	942,031	11,253	12,247
Mercer	3,529	994	43	47
Potter	16,094	13,334	80	80
Venango	586,446	590,124	6,050	6,845
Warren	671,395	564,028	4,384	4,213
Washington	98,983	128,123	552	607
Westmoreland	457	365	7	7
TOTAL	2,650,566	2,644,405	25,991	27,925

*Compiled by the Pennsylvania Department of Commerce, Bureau of Statistics

Figure 3. Oil reserves in Pennsylvania, 1980

	1980	1979	% Change
	(1,000 barrels)		
Total oil	50,559	50,845	- 1
Natural gas liquids	208	266	- 22

SECONDARY AND TERTIARY OIL RECOVERY PROJECTS

Sixty-four service wells were drilled in 1980, compared to 84 in 1979 and 21 in 1978. All but one, a stratigraphic test well in Westmoreland County, were water- or gas-injection wells; there were 34 wells in McKean County, 25 wells in Elk County, and 4 wells in Forest County. This amounts to a 24 percent decrease in oil-related services compared to 1979.

Figure 4 shows the changes in oil production in Pennsylvania since the drilling of Drake's well in 1859, as well as production from the Bradford field in McKean County. Bradford field production accounted for one third of total state production in 1980, and the majority of this production is from waterflooded areas.

No new waterflood projects were reported in 1980. The most active secondary recovery projects were the Bingham Lease waterflood project in the Bradford field, McKean County, involving 26 wells, and the Highland Warrant waterflood project in the Kane field, Elk County, involving 25 wells. Both projects are operated by Pennzoil.

The Penn Grade Micellar Displacement Project at Derrick City, a joint effort of Pennzoil, Witco, Quaker State, and the U. S. Department of Energy for tertiary oil recovery from the Bradford field, progressed satisfactorily throughout 1980. The U. S. Department of Energy's involvement terminated on December 31, 1980, but the project is ongoing. Injection of the "body" phase of the polymer sequence continued throughout the year, resulting in a slight increase in production of oil and a concurrent decrease

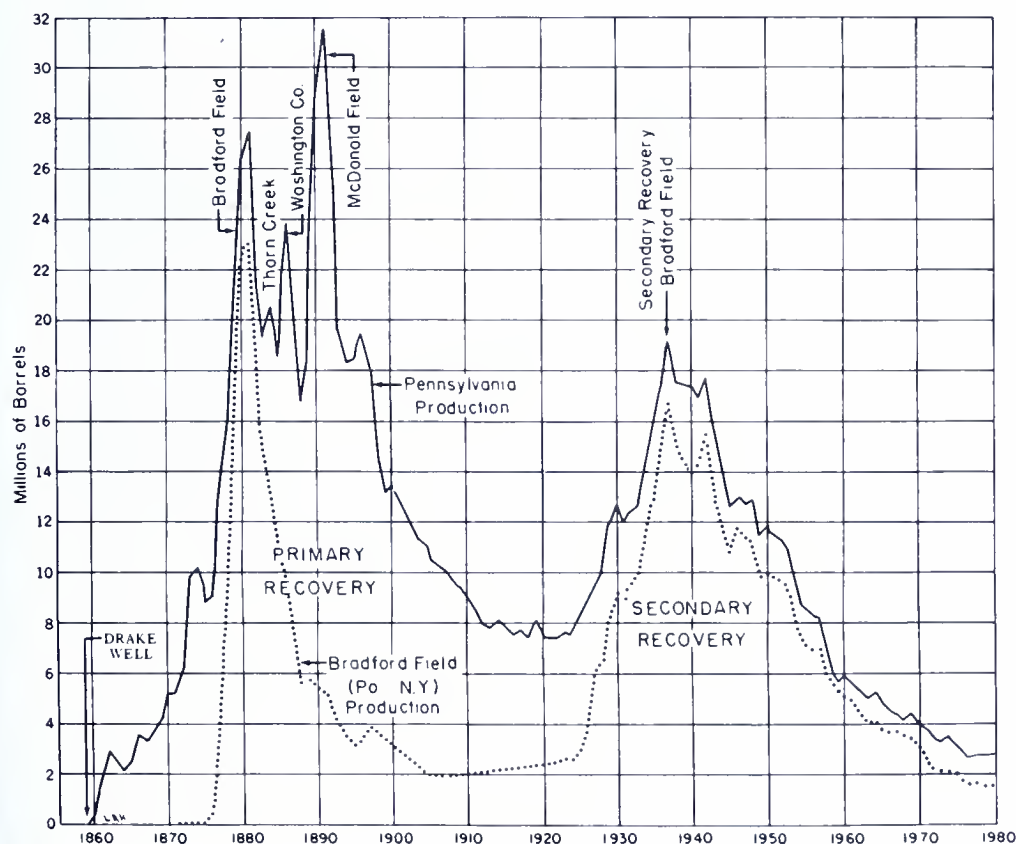


Figure 4. Annual production of crude oil in Pennsylvania

in production of water. The project consists of 25 alternating production and injection wells surrounded by 16 additional production wells, all on a 24-acre tract. The reservoir is the Bradford Third sand. Two other tertiary recovery projects in the Bradford Group sands of the Bradford field continued through 1980. One of these, the Emerson Lease project operated by Pennzoil, is using a microemulsion-flood process.

GAS PRODUCTION

Gas production in Pennsylvania increased 1 percent in 1980, totaling 97,439 million cubic feet as compared to 96,313 million cubic feet in 1979. The number of producing wells in 1980 was approximately 20,000 as compared to 19,800 in 1979, a 1 percent increase. Figure 5 summarizes the production of natural gas in Pennsylvania in 1980.

Figure 5. Gas production in Pennsylvania, 1980

	1980	1979	% Change	Cumulative to 12/31/80
	<i>(millions of cubic feet)</i>			
Shallow gas ¹	82,570	83,787	- 1	- - -
Deep gas ²	14,869	12,526	+ 19	- - -
Total gas	97,439	96,313	+ 1	9,397,368

¹ Shallow gas: from Late Devonian or younger rocks; generally less than 4,000 feet deep.

² Deep gas: from Middle Devonian or older rocks; generally more than 4,000 feet deep.

GAS RESERVES

The total proved recoverable reserves of natural gas in Pennsylvania increased 3 percent in 1980 to 2,316,119 million cubic feet, as compared to 2,251,312 million cubic feet in 1979. Stored recoverable gas decreased 12 percent. Figure 6 shows reserve figures for Pennsylvania for 1979 and 1980. Figure 7 illustrates production, consumption, and reserves of gas in Pennsylvania since 1946.

Figure 6. Gas reserves in Pennsylvania, 1980

	1980	1979	% Change
	<i>(millions of cubic feet)</i>		
Total gas	2,316,119*	2,251,312*	+ 3
Stored recoverable gas	556,615	633,494	- 12

*Includes stored recoverable gas

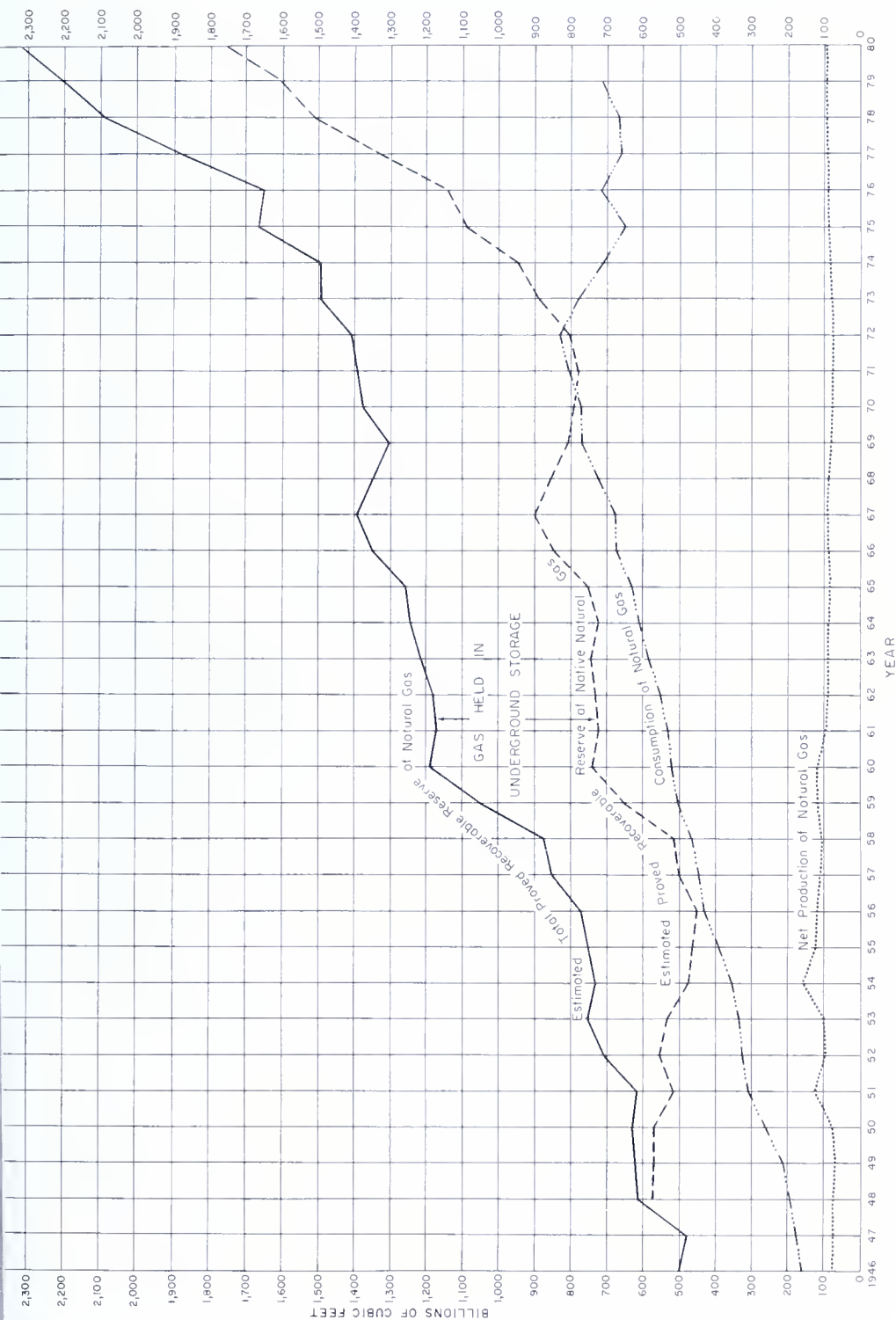


Figure 7. Production, consumption, and reserves of natural gas in Pennsylvania

GAS STORAGE AREAS

Gas storage areas have been created throughout Pennsylvania to accumulate gas during low-demand periods for use during high-demand periods. All gas storage areas used to be designated as fields, but a revision of the oil and gas field and pool nomenclature in Pennsylvania indicates that most storage areas are pools within fields. Figure 8 illustrates the locations and lists the names of all active storage areas in the Commonwealth.

Storage capacity at the end of 1980 was 563,929,420 thousand cubic feet (Mcf), a decrease of 193,680,629 Mcf (26 percent) from 1979. Recoverable gas in storage in 1980 was 556,615,000 Mcf compared with 633,494,000 Mcf in 1979.

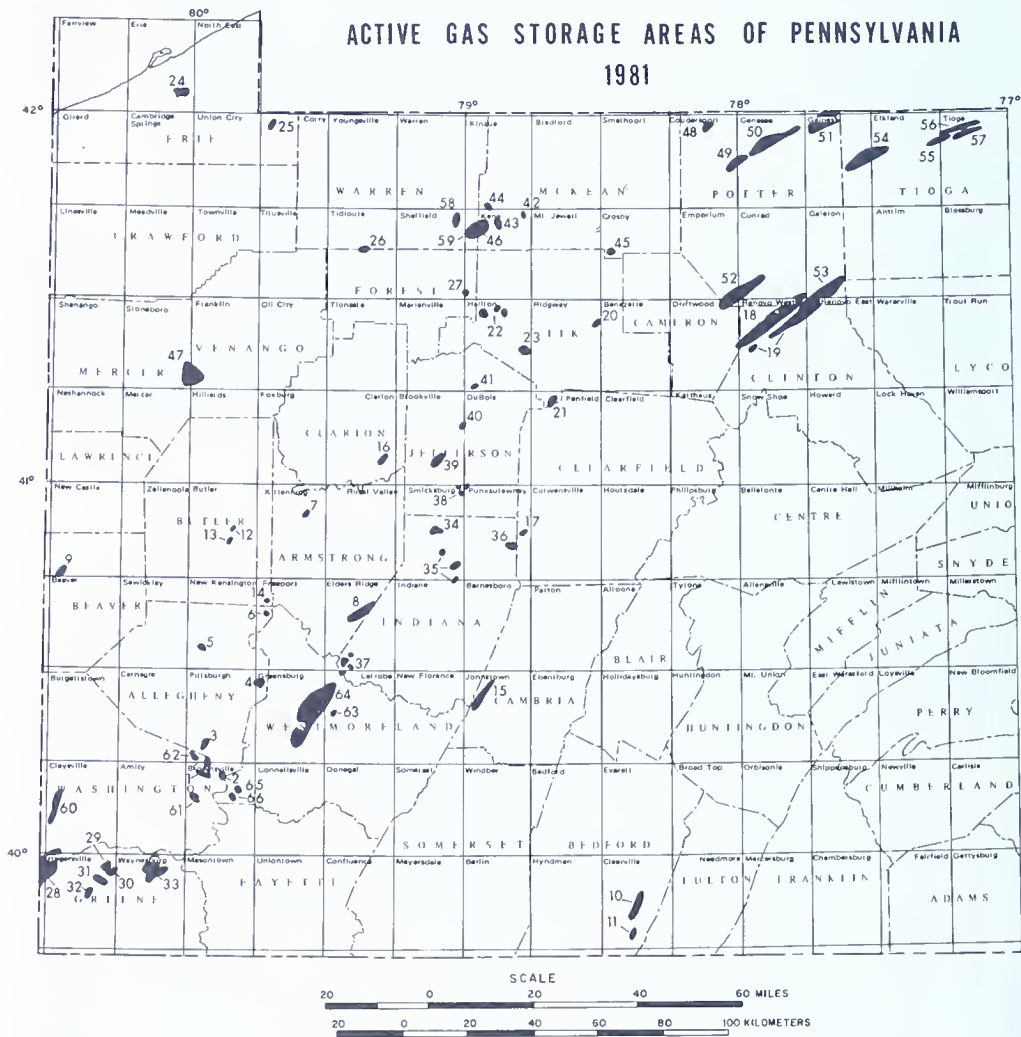


Figure 8. Active gas storage areas of Pennsylvania

NAMES OF ACTIVE GAS STORAGE AREAS IN PENNSYLVANIA

ALLEGHENY COUNTY	ELK COUNTY (Cont.)	MERCER COUNTY
1. Bunolo	22. Owls Nest	47. Henderson
2. Gamble Hoyden	23. Belmouth	POTTER COUNTY
3. Tepe	ERIE COUNTY	48. Shoron
4. Murrys ville (Dice)	24. Summit	49. Hebron
5. Mt. Royol	25. Corry	50. Ellisburg
6. Smith Porke	FOREST COUNTY	51. Horison
ARMSTRONG COUNTY	26. Queen	52. Whorton
7. Foir ond Helm	27. Duhring	53. Greenlick
8. South Bend	GREENE COUNTY	TIOGA COUNTY
BEAVER COUNTY	28. Mojorsville-Heard	54. Sobinsville
9. Block Howk	29. Sworts West	55. Polmer
BEDFORD COUNTY	30. Sworts	56. Tioga
10. Artemos A	31. Hunters Cove	57. Meeker
11. Artemos B	32. Holbrook	WARREN COUNTY
BUTLER COUNTY	33. Prott	58. Deerlick
12. Vordy	INDIANA COUNTY	59. East Branch "A"
13. Portmon	34. Alobron	WASHINGTON COUNTY
14. Hughes	35. Kinter	60. Donegol
CAMBRIA COUNTY	36. Clork	61. Colvin
15. Rager Mountain	37. Schmidt	62. Finleyville
CLARION COUNTY	JEFFERSON COUNTY	WESTMORELAND COUNTY
16. Truittsburg	38. Spronkle	63. Seonor
CLEARFIELD COUNTY	39. Golbroith	64. Oakford
17. Gourley-Miller	40. Morkle	65. Webster
CLINTON COUNTY	41. Munderf	66. Potton
18. Leidy	McKEAN COUNTY	
19. Tamorock	42. Meode Run	
ELK COUNTY	43. Keelor	
20. St. Morys	44. Swede Hill	
21. Boone Mountoin	45. Wellendorf	
	46. Eost Branch "B"	

OIL AND GAS PRICES

Practically all oil production in Pennsylvania was classified as stripper production in 1980 (less than 10 bbl per well per day). The stripper price for Penn Grade Crude was \$38.00 per bbl on January 1, 1980, and, after falling to \$36.00 per bbl by September 1, 1980, ended the year once again at \$38.00 per bbl (Figure 9).

All natural gas prices were subject to the Natural Gas Policy Act (NGPA) in 1980 (Figure 10). The actual well-head price paid by utilities for gas ranged from a low of \$0.29 per Mcf in old contracts to \$2.83 per Mcf for

stripper gas. The average price for gas was approximately \$1.50 per Mcf at the well-head.

Figure 9. Stripper oil prices in Pennsylvania, 1980

<i>Month</i>	<i>Price per barrel</i>
January 1, 1980	\$38.00
September 1, 1980	\$36.00
December 1, 1980	\$37.00
January 1, 1981	\$38.00

DRILLING AND COMPLETION COSTS

The cost of drilling and completing a well is usually given in dollars per foot. These types of costs vary with the company, depth of drilling, method of completion, and geographic area. In any given area, the cost generally increases rapidly as a well penetrates strata below those that are normally considered for drilling and production. Dry holes can be less expensive if no tests are made and if no treatment of the hole is undertaken. Completed producers are usually more expensive, therefore, because more is done to the hole than just drilling. Very deep wells may be extraordinarily expensive in terms of dollars per foot because provision has to be made for any problems that may occur. In Pennsylvania, where the average well is drilled to the Upper Devonian sands at about 2,730 feet (average depth of all wells drilled in 1980), a well below 5,000 feet is considered to be moderately deep, and below 9,000 feet ultra deep.

Because conditions vary widely, even within a single area, and inflation boosts the costs of such necessary items and services as casing, cement, stimulation, and logging, only estimates of drilling costs are available.

1. Venango County, shallow oil well, about 800 feet deep. Dry hole,* about \$11 per foot. Completion, about \$30 per foot.
2. McKean County, shallow oil well, about 2,000 feet deep. Dry hole,* about \$12 per foot. Completion, about \$35 per foot.
3. Indiana County, shallow gas well, about 3,500 feet deep. Dry hole,* about \$20 per foot. Completion, about \$40 per foot.
4. Indiana-Westmoreland Counties, deep gas well (Huntersville Chert or Oriskany Sandstone), about 8,000 feet deep. Completion, about \$45 per foot.
5. Somerset County, deep Oriskany gas well, about 9,000 feet deep. Dry hole, about \$77 per foot. Completion, about \$67 per foot.
6. Erie County, Medina gas well, about 3,000 feet deep. Dry hole,* about \$20 per foot. Completion, about \$40 per foot.

Figure 10. Gas price ceilings under Natural Gas Policy Act of 1980

Subpart of part 271	NGPA Section	Category of gas	Maximum lawful price for deliveries made in:															
			Jan. 1980	Feb. 1980	Mar. 1980	Apr. 1980	May 1980	June 1980	July 1980	Aug. 1980	Sept. 1980	Oct. 1980	Nov. 1980	Dec. 1980	Jan. 1981	Feb. 1981	Mar. 1981	Apr. 1981
			cost per million British Thermal Units															
B	102	New Natural Gas, Certain OCS Gas	\$2.358	\$2.381	\$2.404	\$2.428	\$2.453	\$2.478	\$2.504	\$2.532	\$2.560	\$2.588	\$2.614	\$2.640	\$2.667	\$2.698	\$2.729	\$2.761
C	103	New Onshore Production Wells	\$2.158	\$2.173	\$2.188	\$2.204	\$2.221	\$2.238	\$2.255	\$2.274	\$2.293	\$2.312	\$2.329	\$2.346	\$2.363	\$2.384	\$2.406	\$2.428
F	106 (b) (1) (B)	Alternative Maximum Lawful Price for Certain Intrastate Rollover Gas	\$1.229	\$1.238	\$1.247	\$1.256	\$1.266	\$1.276	\$1.286	\$1.297	\$1.308	\$1.319	\$1.329	\$1.339	\$1.349	\$1.361	\$1.373	\$1.385
G	107 (c) (1)	High Cost Gas (deep gas)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	107 (c) (5)	Gas Produced from Tight Formations	\$4.316	\$4.346	\$4.376	\$4.408	\$4.442	\$4.476	\$4.510	\$4.548	\$4.586	\$4.624	\$4.658	\$4.692	\$4.726	\$4.768	\$4.812	\$4.856
H	108	Stripper Gas	\$2.523	\$2.548	\$2.573	\$2.598	\$2.625	\$2.652	\$2.680	\$2.710	\$2.740	\$2.770	\$2.798	\$2.826	\$2.855	\$2.888	\$2.922	\$2.956
I	109	Not Otherwise Covered	\$1.786	\$1.799	\$1.812	\$1.825	\$1.839	\$1.853	\$1.867	\$1.883	\$1.899	\$1.915	\$1.929	\$1.943	\$1.957	\$1.975	\$1.993	\$2.011

7. Crawford-Mercer Counties, deep Medina gas well, about 5,500 feet deep. Dry hole,* about \$27 per foot. Completion, about \$45 per foot.
8. Centre County, ultra deep Tuscarora gas well, about 11,000 feet deep. Completion, about \$200 per foot.
9. Northumberland County, ultra deep wildcat, about 15,000 feet deep. Dry hole, about \$320 per foot.

*No completion attempted.

1980 DRILLING AND COMPLETIONS

TOTAL COMPLETIONS

The total number of wells reported in 1980 in Pennsylvania was 2,020, including 29 wells drilled deeper. This is an increase of 4 percent (79 wells) over 1979. The actual number of wells drilled should be significantly higher. Almost 7,000 wells were permitted in 1980, and, assuming a drilling rate of 70 percent of permitting, the number of wells drilled in 1980 may actually have been closer to 5,000. This discrepancy can be accounted for mostly by the lag time in filing the required completion reports to the Oil and Gas Regulation Division after a well has been completed.

The total footage drilled in the reported wells during 1980 was 5,461,275 feet, an increase of 13 percent (628,892 feet) over 1979. The average depth per well was 2,730 feet. The eight most active counties in terms of drilling were, in order of importance, Indiana, Venango, Warren, Erie, Crawford, McKean, Jefferson, and Westmoreland. These eight counties accounted for 81 percent of the total number of wells drilled in the Commonwealth (Figure 11).

Figure 11. New well completions and old wells drilled deeper in Pennsylvania, 1980

NEW WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Allegheny	9	3,280
Armstrong	60	3,543
Butler	3	2,376
Cambria	1	3,728
Cameron	3	2,133
Centre	4	9,460
Clarion	38	1,867
Clearfield	30	3,607
Clinton	6	3,138
Crawford	146	4,682
Elk	61	2,372

Figure 11. (Continued)

NEW WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Erie	169	3,619
Fayette	7	5,248
Forest	74	1,017
Greene	15	1,467
Indiana	419	3,746
Jefferson	97	3,324
Lawrence	1	4,202
McKean	144	1,889
Mercer	3	3,928
Northumberland	1	14,737
Potter	21	1,719
Somerset	18	9,026
Tioga	4	989
Venango	374	882
Warren	177	1,293
Washington	12	2,857
Westmoreland	94	3,985
TOTAL	1,991	2,730

OLD WELLS DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Armstrong	5	363
Butler	1	747
Clarion	1	290
Elk	1	49
Fayette	1	1,310
Forest	1	1,564
Greene	2	243
Indiana	9	1,369
Jefferson	5	1,167
Tioga	1	238
Washington	1	1,030
Westmoreland	1	1,392
TOTAL	29	934

OIL COMPLETIONS

The total number of oil wells completed in Pennsylvania in 1980 was 777, including one old well drilled deeper. This is a 3 percent increase (20 wells) over the 757 wells drilled in 1979. The total footage drilled was 933,614 feet,

an increase of 16 percent (131,787 feet) over 1979. The average depth of these wells was 1,266 feet. The most active counties for oil well drilling were, in order of importance, Venango, Warren, and McKean. Drilling in these counties accounted for 83 percent of all the oil wells drilled in Pennsylvania (Figure 12).

Figure 12. New oil well completions and old wells drilled deeper in Pennsylvania, 1980

NEW OIL WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average initial production (bopd)*</i>	<i>Average total depth (feet)</i>
Armstrong.....	1	4	1,585
Butler	1	1	1,818
Clarion	8	4	1,395
Crawford	8	5	3,674
Elk	34	3	2,410
Forest	58	15	889
McKean.....	99	7	1,820
Mercer.....	1	not given	1,100
Potter	18	6	1,546
Tioga.....	3	not given	903
Venango	370	11	873
Warren	173	16	1,250
Washington.....	2	3	2,682
TOTAL	776	11	1,203

OLD OIL WELL DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average initial production (bopd)*</i>	<i>Average amount deepened (feet)</i>
Tioga.....	1	not given	238

*bopd = barrels of oil per day

GAS COMPLETIONS

The total number of gas wells drilled in Pennsylvania in 1980 was 1,100, including 25 wells drilled deeper. This is an increase of 6 percent (57 wells) over 1979. The total footage drilled was 4,070,209 feet, an increase of 10 percent (383,182 feet) over 1979. The average depth per well was 3,700 feet. The most active counties in terms of gas well drilling were, in order of importance, Indiana, Erie, Crawford, Jefferson, and Westmoreland. These five counties accounted for 80 percent of total gas well drilling in the Commonwealth (Figure 13).

Figure 13. New gas well completions and old wells drilled deeper in Pennsylvania, 1980

NEW GAS WELL COMPLETIONS

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcf/gpd)*</i>	<i>Average total depth (feet)</i>
Allegheny	9	157	3,280
Armstrong	59	450	3,576
Cambria	1	444	3,728
Cameron	2	64	2,135
Centre	3	3,517	10,319
Clarion	25	181	2,132
Clearfield	29	420	3,457
Clinton	5	41	3,748
Crawford	126	1,339	4,800
Elk	1	20	1,708
Erie	161	920	3,651
Fayette	5	296	4,838
Forest	7	7	1,492
Greene	15	613	1,467
Indiana	415	1,094	3,754
Jefferson	94	547	3,359
Lawrence	1	133	4,202
McKean	9	191	1,932
Mercer	2	860	5,335
Potter	1	300	1,890
Somerset	10	995	9,022
Tioga	1	30	1,245
Warren	2	473	4,885
Washington	7	281	2,952
Westmoreland	85	679	3,972
TOTAL	1,075	897	3,787

OLD GAS WELLS DRILLED DEEPER

<i>County</i>	<i>No. of wells</i>	<i>Average initial open flow (Mcf/gpd)*</i>	<i>Average amount deepened (feet)</i>
Armstrong	5	99	363
Butler	1	5	747
Elk	1	20	49
Fayette	1	10	1,310
Forest	1	294	42
Indiana	9	566	1,369
Jefferson	5	252	1,167
Washington	1	140	1,030
Westmoreland	1	100	1,392
TOTAL	25	297	981

*Mcf/gpd = thousand cubic feet of gas per day

COMBINATION OIL AND GAS WELL COMPLETIONS (Not Reported Separately as Oil or Gas)

Combination oil and gas wells are wells that are primarily oil wells, but that also produce 100 thousand cubic feet of gas per day (Mcfgpd) or more. Most oil wells drilled in the Commonwealth produce only a little gas. Therefore, the total number of combination oil and gas wells is small, 24 in all, as compared with the total number of all wells. However, this small figure is an increase of 300 percent (18 wells) over those reported in 1979. The total footage drilled was 50,490 feet, an increase of 289 percent (37,495 feet) over 1979. The average depth of these wells was 2,858 feet. Forty-two percent of the wells (10 wells) were drilled in Crawford County (Figure 14).

Figure 14. New combination oil and gas well completions in Pennsylvania, 1980

<i>County</i>	<i>No. of wells</i>	<i>Average initial production (bopd)*</i>	<i>Average initial open flow (Mcfgpd)**</i>	<i>Average total depth (feet)</i>
Clarion	4	1	88	1,343
Crawford.....	10	7	581	3,903
Erie	2	3	500	3,307
Forest	4	60	132	2,141
Potter	1	5	50	1,365
Warren	1	10	100	2,062
Washington.....	2	9	448	2,792
TOTAL	24	15	364	2,858

*bopd = barrels of oil per day

**Mcfgpd = thousand cubic feet of gas per day

DRY COMPLETIONS

The total number of dry holes drilled in Pennsylvania in 1980 was 55, including 3 old wells drilled deeper and completed dry. This represents an increase of 8 percent (4 wells) over 1979. The total footage drilled was 232,066 feet, an increase of 29 percent (52,208 feet) over 1979. Figure 15 shows the number of dry holes drilled and deepened in 1980.

MISCELLANEOUS COMPLETIONS

This heading includes several different types of drilled holes: stratigraphic or core tests, which are holes drilled to collect subsurface information (depth to certain horizons, thicknesses of various strata, effects of drilling, fluid extraction or fluid input on the physical nature of various rocks, etc.); water-input wells for secondary recovery by waterflood operations;

Figure 15. New dry hole completions and old wells drilled deeper but completed dry in Pennsylvania, 1980

NEW DRY HOLE COMPLETIONS

<i>County</i>	<i>No. of dry holes</i>	<i>Average total depth (feet)</i>
Butler	2	2,655
Cameron	1	2,129
Centre	1	6,884
Clarion	1	1,122
Clearfield	1	7,950
Clinton	1	90
Crawford	2	5,161
Elk	1	1,925
Erie	6	2,854
Fayette	2	6,271
Forest	1	1,141
Indiana	4	2,924
Jefferson	3	2,236
McKean	2	3,334
Northumberland	1	14,737
Potter	1	5,019
Somerset	8	9,030
Venango	4	1,797
Warren	1	823
Washington	1	2,670
Westmoreland	8	4,527
TOTAL	52	4,433

OLD WELLS DRILLED DEEPER, COMPLETED DRY

<i>County</i>	<i>No. of wells</i>	<i>Average amt. deepened (feet)</i>
Clarion	1	290
Forest	1	1,564
Greene	1	444
TOTAL	3	766

air- or gas-injection wells for secondary recovery by air or gas drive; water-supply wells for waterflood projects; liquid-waste disposal wells; and gas storage observation wells. Fluctuations within this category are not usually indicative of the nature of general drilling activity. However, during 1980 the number of wells drilled for service decreased 24 percent (20 wells) compared with 1979. The total footage drilled for service was 131,287 feet, a decrease of 15 percent (19,391 feet) over 1979. The average footage was 2,051 feet. All but one well, a stratigraphic test hole in Westmoreland County, were water- or gas-injection wells used for secondary oil recovery opera-

tions. Ninety-two percent of these wells were drilled in McKean and Elk Counties (Figure 16).

Figure 16. Service well completions in Pennsylvania, 1980

<i>County</i>	<i>No. of wells</i>	<i>Average total depth (feet)</i>
Elk	25	2,366
Forest	4	899
McKean	34	1,995
Westmoreland	1	741
TOTAL	64	2,051

DRILLING AND PRODUCTION ACTIVITY
(Classified as Shallow or Deep)

The Pennsylvania Geological Survey, Oil and Gas Geology Division, classifies wells drilled in the Commonwealth as follows: wells that do not penetrate the Upper-Middle Devonian boundary, commonly the Tully Limestone, are considered to be shallow; wells that do penetrate the Tully Limestone or its equivalent, regardless of depth, are considered to be deep. Because of the geometry of the depositional basin and the relative thicknesses of sediments (which are generally wedge-shaped) within the basin, absolute drilling depth is not instrumental in this classification. Shallow wells are generally less than 4,000 feet deep, but this is more of a production depth limit than a drilling depth limit. In Erie County, along the Lake Erie shoreline, the “deep” Lower Silurian Medina Group sandstones are encountered at a depth of about 2,500 feet, whereas the “shallow” Upper Devonian Bradford Group sandstones in Indiana County can be 3,500 feet deep or more.

The shallow reservoirs generally produce both oil and gas; the deep almost entirely gas. Figure 17 shows the shallow well activity in Pennsylvania from 1950 to 1980.

The Medina Group sandstones (Lower Silurian) in northwestern Pennsylvania are generally less than 5,000 feet deep. They produce mostly gas, but a little oil is produced in various localities. This group of rocks is considered to be deep because of its position in the stratigraphic record.

Deep drilling was up greatly from 175 wells in 1979 to 353 in 1980, a 102 percent increase. Erie and Crawford Counties were the most active deep drilling areas with 164 and 146 wells, respectively. Of these 310 wells, 8 were oil wells, 283 were gas wells, 12 were combination oil and gas wells, and 7 were dry holes. Figure 18 shows the annual rate of deep exploration and development in Pennsylvania from 1930 to 1980.

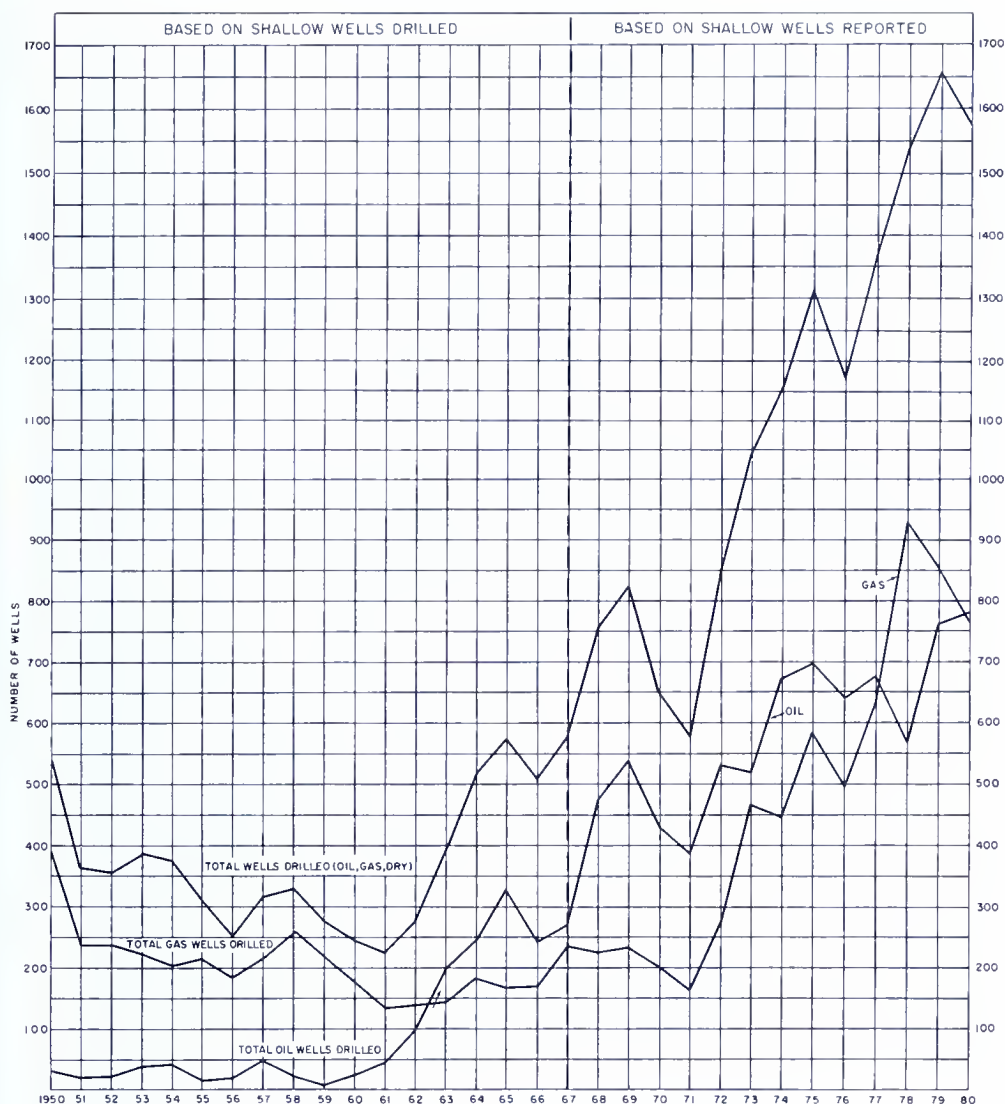


Figure 17. Shallow well activity, 1950-1980 (Late Devonian or younger producing horizons; generally less than 4,000 feet)

The Amoco #1 Svetz, drilled in Somerset County in 1974 to 21,460 feet, is still the deepest penetration in the Appalachian basin. Figure 19 shows 1980 completions divided into wells in Late Devonian and younger formations and wells in Middle Devonian and older formations.

A total of 14,869 million cubic feet of gas and 73,218 bbl of oil were produced from deep reservoirs in 1980. A summary by field and pool of deep gas production in 1980 and of the cumulative production from these reservoirs is given in Figure 20. The producing depth record still stands at 11,458 feet from the Lower Silurian Tuscarora Sandstone in Heyn pool, Summit field, in Fayette County.

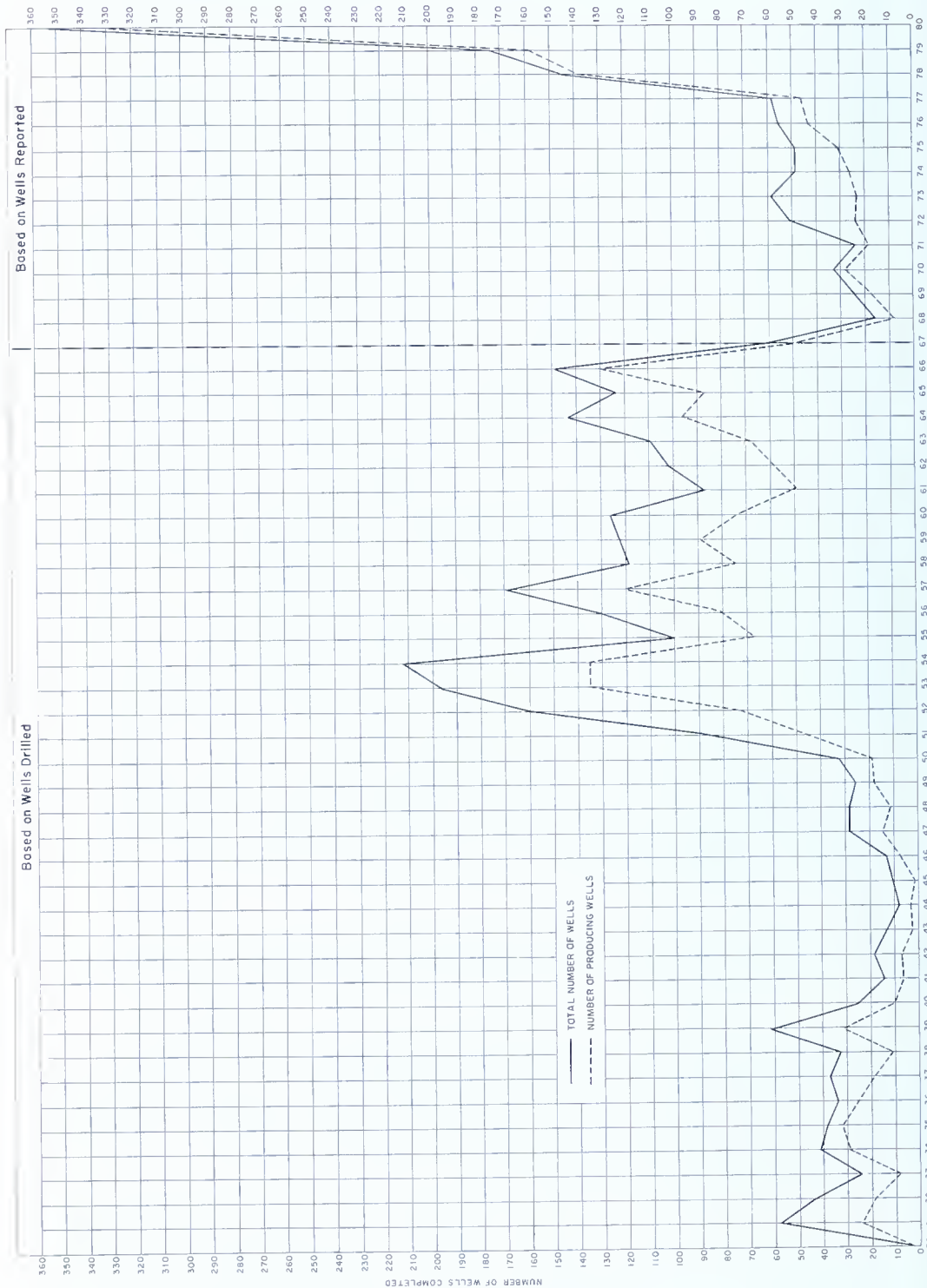


Figure 18. Annual rate of deep sand exploration and development, 1930-1980 (Middle Devonian or older producing

Figure 19. Drilling and completion of wells reported, 1980 (according to geologic age and depth of producing horizons)

<i>Shallow — Upper Devonian and younger</i>	
NEW WELLS	
Gas.....	766
Oil	768
Oil and gas	12
Dry.....	29
<i>Total</i>	1,575
DEEPENED WELLS	
Gas.....	25
Oil	1
Dry.....	2
<i>Total</i>	28
MISCELLANEOUS WELLS	
Service	64
<i>Deep — Middle Devonian and older</i>	
NEW WELLS	
Gas.....	309
Oil	8
Oil and gas	12
Dry.....	23
<i>Total</i>	352
DEEPENED WELLS	
Dry.....	1
<i>TOTAL ALL WELLS DRILLED</i>	2,020

OTHER ACTIVITIES RELATED TO OIL AND GAS DEVELOPMENTS

GEOPHYSICAL ACTIVITY

The principal nondrilling exploratory tool used in Pennsylvania in the exploration of oil and gas resources is the seismograph, which can give approximate to excellent indications of the attitude of rocks at depth by measuring the time of travel of vibrations to and from the surface. The principal technique presently in use in Pennsylvania is Vibroseis, wherein seismic pulses are generated at the surface by mechanical means. However, there is a growing use of explosive techniques, especially in the central counties of the state, because resolution of complex structures is better. This method of seismic exploration requires the operator to drill shallow holes, usually about 80 feet deep, into which he places sticks or cans of dynamite. Readings are taken at the surface when the dynamite is detonated. The work is usually done by contract crews, and the intensity of activity is gauged by the number of crew-months of operations. Seismic exploration was up 52 per-

Figure 20. Gas production from rocks of Middle Devonian or older age in Pennsylvania, 1980
(classified as "deep" production)

County	Field	Pool	Discovery date	Cumulative production at end of 1979 (in Mcf*)	Production 1980 (in Mcf*)	Cumulative production at end of 1980 (in Mcf*)	Status of field or pool at end of 1980
Armstrong	Goheenville	Snyderville	10/23/70	267,030	12,203	279,233	Producing
	Roaring Run	Roaring Run	12/14/70	6,596,338	408,787	7,005,125	Producing and abandoned
Bedford and Blair	Pavia	Oriskany	1/20/61	0	0	0	Shut-in
Cambria	Carrolltown	Burley	1/13/69	309,004	32,152	341,156	Producing
		Pindleton	6/30/69	4,721,571	171,943	4,893,514	Producing
Cameron	East Emporium		11/18/71	3,732,804	248,832	3,981,636	Producing
Cameron and Elk	Hicks Run		6/ 7/56	4,316,961	13,266	4,330,227	Producing
	Whippoorwill		7/10/61	15,800,729	89,781	15,890,510	Producing
Cameron, Clearfield, Elk, Indiana, and Jefferson	Punxsutawney-Driftwood	Total	9/15/51	379,482,943	1,041,626	380,524,569	Producing and shut-in
		Benezette	1/ 5/53	249,600,764	285,309	250,087,413	Producing
		Driftwood	9/15/51		201,340		Producing
		Helvetia	5/11/60		83,993		Producing
		Rockton	2/25/55	129,882,179	464,296	130,437,156	Producing
		Reed-Deemer	12/ 1/53		6,688		Producing and shut-in
Centre	Big Run		12/18/77	0	52,050	52,050	Producing
	Devils Elbow		2/28/80	0	0	0	Shut-in
	Runville		2/22/80	0	0	0	Shut-in
Clarion	Clarion-Miola	Weaver	9/15/76	30,474	5,920	36,394	Producing
Clearfield	Boone Mt.	Moshannon	9/25/75	67,231	171	67,402	Producing
	Irish Run	Anderson Creek	3/30/73	3,250,211	379,526	3,629,737	Producing and shut-in
	West Decatur		9/18/58	106,528,432	334,651	106,863,083	Producing
Clearfield, Elk, and Jefferson	Penfield	Total	1/ 6/60	105,524,505	265,612	105,790,117	Producing
		DuBois	8/26/63	1,003,927	69,039	1,072,966	Producing
		Sabula					

Clinton and Potter	Leidy	Total	1/ 8/50	160,324,301	21,984	160,346,283	Gas storage, producing and shut-in
Crawford Athens	Ole Bull		1/ 9/59	5,524,269	21,984	5,546,253	Producing and shut-in
	Total		9/20/74	0	486,103	486,103	Producing and shut-in
	Brimstone		1/30/79	0	327,388	327,388	Producing and shut-in
	Dutch Hill		8/31/80	0	0	0	Shut-in
	Lincolnvillle		8/16/80	0	0	0	Shut-in
	Potash Run		3/18/79	0	20,363	20,363	Producing and shut-in
	Rome		6/ 9/79	0	0	0	Shut-in
	Cambridge Springs		1/31/76	118,382	49,670	168,052	Producing
	Church Run		6/27/79	0	0	0	Shut-in
	Vrooman		12/ 7/79	0	0	0	Shut-in
Frenchtown	Total		8/17/80	0	0	0	Shut-in
	Guys Mills		8/26/80	0	0	0	Shut-in
	Greenwood		10/31/73	0	0	0	Shut-in
	Rock Creek		6/27/77	0	0	0	Shut-in
	Total		7/26/77	0	0	0	Shut-in
Kantz Corners	East Fairfield		7/31/80	0	0	0	Shut-in
	Mt. Pleasant Road		8/30/80	0	0	0	Shut-in
	Shaws Corners		7/15/80	0	0	0	Shut-in
			11/30/79	0	0	0	Shut-in
			8/ 9/79	0	0	0	Shut-in
Rockdale South Shenango Sparta	Eastman Hill		10/30/75	0	0	0	Shut-in
	Total		2/11/57	40,051,287	1,473,645	41,524,932	Producing and abandoned
Crawford and Erie	Bushnell-Lexington		12/31/58	17,103,113	300,744	17,403,857	Producing and abandoned
	Forro		1/ 4/58	15,138	6,949	22,087	Producing
	Indian Springs		9/11/57	15,080,079	374,898	15,454,977	Producing
	Kastle		7/14/62	715,902	310,479	1,026,381	Producing
	Lundys Lane		11/ 9/61	2,652,097	395,650	3,047,747	Producing and abandoned
	Pierce		12/31/58	877,637	17,845	895,482	Producing
	Springboro		11/ 7/79	0	44,693	44,693	Producing
	Stone Run		10/21/79	0	20,654	20,654	Producing
	West Mead		7/ 8/74	11,837	1,733	13,570	Producing

Figure 20. (Continued)

County	Field	Pool	Discovery date	Cumulative production at end of 1979 (in Mcf*)	Production 1980 (in Mcf*)	Cumulative production at end of 1980 (in Mcf*)	Status of field or pool at end of 1980
Elk.....	Horton	Boot Jack	9/20/73	11,275	0	11,275	Shut-in
Erie.....	Carter Hill		5/14/79	0	0	0	Shut-in
	Concord	Harbor Ridge	10/ 2/79	0	0	0	Shut-in
		Stewart Road	3/10/80	0	0	0	Shut-in
	Corry	Total	4/29/47	1,070,871	5,227	1,076,098	Producing and shut-in
		Beaver Dam	5/20/53	217,171	4,808	221,979	Producing and shut-in
		Spencer Creek	6/19/70	0	419	419	Producing and shut-in
	Edinboro North		1/ 9/80	0	0	0	Shut-in
	Erie	Bartosik	3/ 7/79	1,586	24,777	26,363	Producing
		Blass	2/12/66	0	0	0	Abandoned
		Brandy Run	5/28/79	0	118	118	Producing
		Charter Oaks	5/19/77	45,948	31,697	77,645	Producing and shut-in
		Dunn Valley	1/19/80	0	5,422	5,422	Producing
		Fairplain	6/ 5/79	122	555	677	Producing
		Fairview	3/12/76	1,653	2,363	4,016	Producing and shut-in
		Glenwood	8/ 9/77	31,866	13,468	45,334	Producing
		Goddard	8/31/78	19,665	21,029	40,694	Producing
		Heidler	5/22/79	0	0	0	Shut-in
		Lawrence Park	8/30/77	1,700	1,541	3,241	Producing
		McKean	1/19/73	135,561	0	0	Shut-in
		Talcott	7/ 8/79	0	7,833	7,833	Producing
	Franklin Center		6/16/80	0	0	0	Shut-in
	LeBoeuf	Waterford	3/21/77	247,676	580,645	828,321	Producing and shut-in
	Mill Village		7/27/79	1,500	26,000	27,500	Producing
	New Ireland	Total	5/14/78	41,826	42,512	84,338	Producing
		Pattison	11/ 9/79	0	6,093	6,093	Producing

North East	Bailey Brook	1/11/80	0	7,163	7,163	Producing
	Bull Reservoir	9/17/60	45,466	7,928	53,394	Producing and shut-in
	Burgess	10/17/60	713,428**	527,231	1,240,659	Producing
	Delhill Corners	6/23/79	0	467	467	Producing
	Half Moon	9/ 6/79	0	0	0	Shut-in
	Harborcreek	10/20/77	280,557	250,022	530,579	Producing
	Hornby	6/10/78	30,105	107,501	137,606	Producing
	Kuhl	8/14/78	8,565	6,521	15,086	Producing
	Little Hope	12/ 7/78	6,471	3,155	9,626	Producing and shut-in
	McGuire	2/ 8/80	0	0	0	Shut-in
	Orchard Beach	2/18/74	939,264	598,711	1,537,975	Producing and shut-in
	Wattsburg	4/19/80	0	22	22	Producing
		7/ 9/80	0	0	0	Shut-in
Reeds Corners		7/27/78	0	14,829	14,829	Producing and shut-in
Erie and Warren	Brokenstraw	8/ 8/63	7,696	5,928	13,624	Producing
Fayette	Feik	3/10/75	0	not available	0	Producing
	Highhouse	8/17/78	0	0	0	Shut-in
	Mill Run	6/ 3/69	16,517	3,961	20,478	Producing
	Sandy Creek	10/13/61	6,816,089	352,010	7,168,099	Producing
	Spruell	12/30/60	27,150	0	27,150	Abandoned
	Summit	3/24/38	21,586,559	62,516	21,649,075	Producing and abandoned
		5/ 9/42	22,516,672	108,651	22,625,323	Producing
Fayette and Somerset . .	Ohioptyle	12/28/59	4,438,996	49,795	4,488,791	Producing and abandoned
Indiana	Cherry Hill	1/ 9/63 } 7/11/63 }	3,077,286	31,975	3,167,014	Producing
	Jacksonville	11/17/56 } 9/21/56 }	29,825,694	175,868	30,001,562	Producing
		2/21/80	0	0	0	Shut-in
	Living Waters	4/28/80	0	0	0	Shut-in
	Nolo	9/30/56	13,846,783	56,604	13,903,387	Producing
		6/19/54	8,573,700	712,909	9,286,609	Producing
Strongstown		12/20/69	8,657,758	1,169,158	9,826,916	Producing

Figure 20. (Continued)

County	Field	Pool	Discovery date	Cumulative production at end of 1979 (in Mcf*)	Production 1980 (in Mcf*)	Cumulative production at end of 1980 (in Mcf*)	Status of field or pool at end of 1980
Jefferson	Frostburg	Elk Run	6/30/65	48,176,808	278,828	48,455,636	Producing and shut-in
Lawrence	Neshannock Creek		12/14/79	0	0	0	Shut-in
Lycoming	Salladasburg	Total	6/24/76	29,139	4,089	33,228	Producing and shut-in
		Tombs Run	5/26/78	0	0	0	Shut-in
McKean	Bradford	Cyclone	2/18/74	965,799	147,817	1,113,616	Producing
		Minard Run	1/10/75	11,500	700	12,200	Producing
			9/ 8/72	16,887	13,818	30,705	Producing
	Corydon		11/11/76	0	5,400	5,400	Producing
Mercer	Maysville	Sharon Deep	2/26/77	0	7,600	7,600	Producing and shut-in
	Sharon		7/24/63	270,996	25,635	296,631	Producing and shut-in
	Wheatland		10/26/66	352,122	174,384	526,506	Producing
Potter	Wolf Creek	Kilgore	10/ 2/39	4,327,605	64,872	4,392,477	Producing
	Ulysses	Total	4/ 2/62		42,791		Producing
		Newfield	1/14/79	0	131,257	131,257	Producing
Somerset	Bakersville		11/11/58	11,069,966	184,348	11,254,314	Producing
	Boswell	Total	10/18/68	24,196	4,712	28,908	Producing
		Edie	6/16/60	1,066,564	179,636	1,246,200	Producing
		Snyder	8/16/77	0	196,973	196,973	Producing
	Heckman Hollow		5/ 9/80	0	28,062	28,062	Producing
	Kimmel		5/28/79	0	295,312	295,312	Producing and shut-in
	Rockwood	Total	11/26/79	0	0	0	Shut-in
		Gebhart	10/ 3/77	0	156,936	156,936	Producing
	Shade Creek		5/10/79	68,414	1,214,492	1,282,906	Producing
	Shamrock		9/22/73	3,193,918	920,750	4,114,668	Producing
	Shanksville		10/ 7/79	0	0	0	Shut-in
	Somerset East		1/ 6/78	559,268	87,371	646,639	Producing
	Somerset West						

Venango.	Barkeyville	Duncan	4/ 5/73	112,322	6,322	118,644	Producing
	Franklin-Oak	Galloway	11/12/73	53,846	5,795	59,641	Producing
	Forest						
	Wesley	Irwin	12/ 1/72	273,879	21,993	295,872	Producing
Warren.	Columbus	Whites Run	10/30/75	0	0	0	Shut-in
	Stillwater	<i>Total</i>	9/26/79	0	0	0	<i>Shut-in</i>
		Freehold	8/ 5/80	0	0	0	Shut-in
		Savko	9/ 5/80	0	0	0	Shut-in
	Sugar Grove	Pettigrew	5/29/70	0	0	0	Shut-in
Washington	Lone Pine	Glyde	9/ 6/61	131,880	5,605	137,485	Producing
Westmoreland	Crabtree	Dry Ridge	8/25/46	5,868,612	103,851	5,972,463	Producing and abandoned
	Jacobs Creek	Bailey	12/26/61	2,094,266	77,376	2,171,642	Producing
	Linn Run		4/25/79	0	5,344	5,344	Producing
	Lycippus	<i>Total</i>	8/17/49	6,628,747	20,933	6,649,680	<i>Producing</i>
		St. Boniface Chapel	9/13/56	5,889,319	20,933	5,910,252	<i>Producing</i>
	Murrysville	<i>Total</i>	10/22/63	747,790	13,222	761,012	<i>Producing</i>
		Duquesne	8/ 8/65	619,673	13,222	632,895	<i>Producing</i>
	New Alexandria	Kahl	10/23/62	10,831,599	191,726	11,023,325	<i>Producing</i>
Westmoreland and	Johnstown	Baldwin	5/22/60	11,140,492	9,655	11,434,749	<i>Producing</i>
Somerset.		Beck	5/16/57		284,602		<i>Producing</i>
		Williams	2/14/58	18,588,841	206,492	18,795,333	<i>Producing</i>
	Seven Springs	<i>Total</i>	12/ 5/58	7,803,534	81,580	7,885,114	<i>Producing</i>
		Blair Oriskany	12/ 5/58	6,362,700	55,783	6,429,836	<i>Producing</i>
		Tunnel	3/10/65		11,353		<i>Producing</i>
		Seven Springs	8/ 3/66	728,411	14,444	742,855	<i>Producing</i>

*Mcf—thousand cubic feet

**Correction

cent in 1980, to 45.25 crew-months as compared with 29.78 crew-months in 1979. Seismic surveys were reported in Bedford, Blair, Cambria, Centre, Columbia, Fayette, Huntingdon, Indiana, Lawrence, Luzerne, Lycoming, McKean, Mercer, Northumberland, Schuylkill, Somerset, Sullivan, Venango, Westmoreland, and Wyoming Counties. Eight seismic permits were issued by the Pennsylvania Department of Environmental Resources for evaluation of oil and gas possibilities on state lands. These permits were issued for Bedford, Fayette, Fulton, Huntingdon, and Somerset Counties.

ACTIVITIES ON STATE LANDS

At the end of 1980 there were 51 active oil and/or gas leases on Pennsylvania Game Commission lands. These leases covered a total of 61,233 acres. Twelve of the leases contained 45 active wells which produced a total of 412,652 Mcf, generating \$120,315 in ground rentals and royalties. This compared with 48 leases covering 69,227 acres during 1979, and with 37 wells which produced 377,687 Mcf. No oil is reported to have been produced during 1980. Also, no new leases were offered during the year by the Game Commission. Four leases in Blair and Centre Counties, acquired in 1974, were surrendered by Gulf Oil Corporation.

Total income from oil and gas activities on Pennsylvania State Forest and Park lands during 1980 amounted to \$3,989,195. This income was produced from rentals, including bonuses from lease sales, royalties, gas storage rentals, pipeline and compressor station rentals, and seismic surveys. Royalty payments for the year amounted to \$47,905 for gas produced. Rentals for existing exploratory acreage and past leasing programs totaled \$3,259,680, and gas storage rentals totaled \$668,213. Other income for seismic surveys and for pipeline and compressor station rentals totaled \$13,397.

During the year 57 individual tracts totaling 161,401 acres were offered for lease to industry. Because many of the tracts were offered for lease near the end of the year, only 103,377 acres of the total was recorded for 1980. The remainder of this acreage will be recorded in 1981.

At the end of 1980 there was 294,291 acres of State Forest and Park lands under lease for oil and gas exploration and development. Another 100,493 acres was leased for gas storage.

1980 OIL AND GAS EXPLORATORY AND DEVELOPMENT HIGHLIGHTS

These classifications apply to the same wells reported under drilling and completions. Explanations for exploratory and development wells are modified from definitions used by the Committee on Statistics of Drilling of the American Petroleum Institute/American Association of Petroleum Geologists.

EXPLORATORY WELLS

An exploratory well is one that is drilled to: (1) find and produce oil or gas in unproven areas; (2) find a new reservoir in an area previously known to have oil or gas production in another reservoir; or (3) extend the known limit of a productive oil or gas reservoir. Exploratory wells are classified as new field wildcats, new pool wildcats, deeper pool tests, shallower pool tests, and outpost/extension tests. If the well is not completed for production, it is a dry exploratory hole. Exploratory drilling in 1980 was up 91 percent (132 wells) from 69 wells in 1979, and the success rate was 86 percent (see Figure 21 for locations of selected exploratory wells drilled in Pennsylvania in 1980).

DEVELOPMENT WELLS

A development well is one that is drilled within a proven area of production to a known productive stratigraphic horizon. A producing well in such an area and reservoir is considered to be an oil or gas development well. If the well is not completed for production, it is a dry development hole. Development drilling in Pennsylvania in 1980 was up 2 percent (1,824 wells) from 1,788 wells in 1979. The success rate for development wells was 98 percent.

Figure 22 shows statistics for both exploratory and development wells classified as gas, oil, oil and gas, and dry, and gives total footage. Also included in this figure are the statistics for service wells. Figure 23 shows exploratory drilling in Pennsylvania by exploratory classification and type of well.

HIGHLIGHTS OF 1980 EXPLORATION

Amoco Production Company and Ashtola Production Company, a division of UGI Development Corporation of Valley Forge, Pennsylvania, began a program of deep exploration and development drilling in Pennsylvania in 1977. During the succeeding years, the two companies discovered 12 new fields in Somerset, Westmoreland, Fayette, and Centre Counties. During 1980, 19 Amoco-Ashtola wells were drilled in the state; 10 were productive and 9 were dry holes. All of these holes were in Somerset (18 wells) and Fayette Counties. In addition to the Amoco-Ashtola program, Amoco has been working independently with a program of exploration in central Pennsylvania, in the area commonly referred to as the Eastern Overthrust Belt. During 1980 Amoco drilled 3 exploratory wells; 2 were in Centre County, and 1 was an ultra-deep well in Northumberland County.

In Somerset County, two new fields and a new pool were discovered in 1980. The new fields, Somerset East and Kimmel, produced from Oriskany Sandstone (Lower Devonian) at depths of 9,151 feet and 9,071 feet, respec-

NUMEROUS EXTENSION
WELLS IN THIS AREA

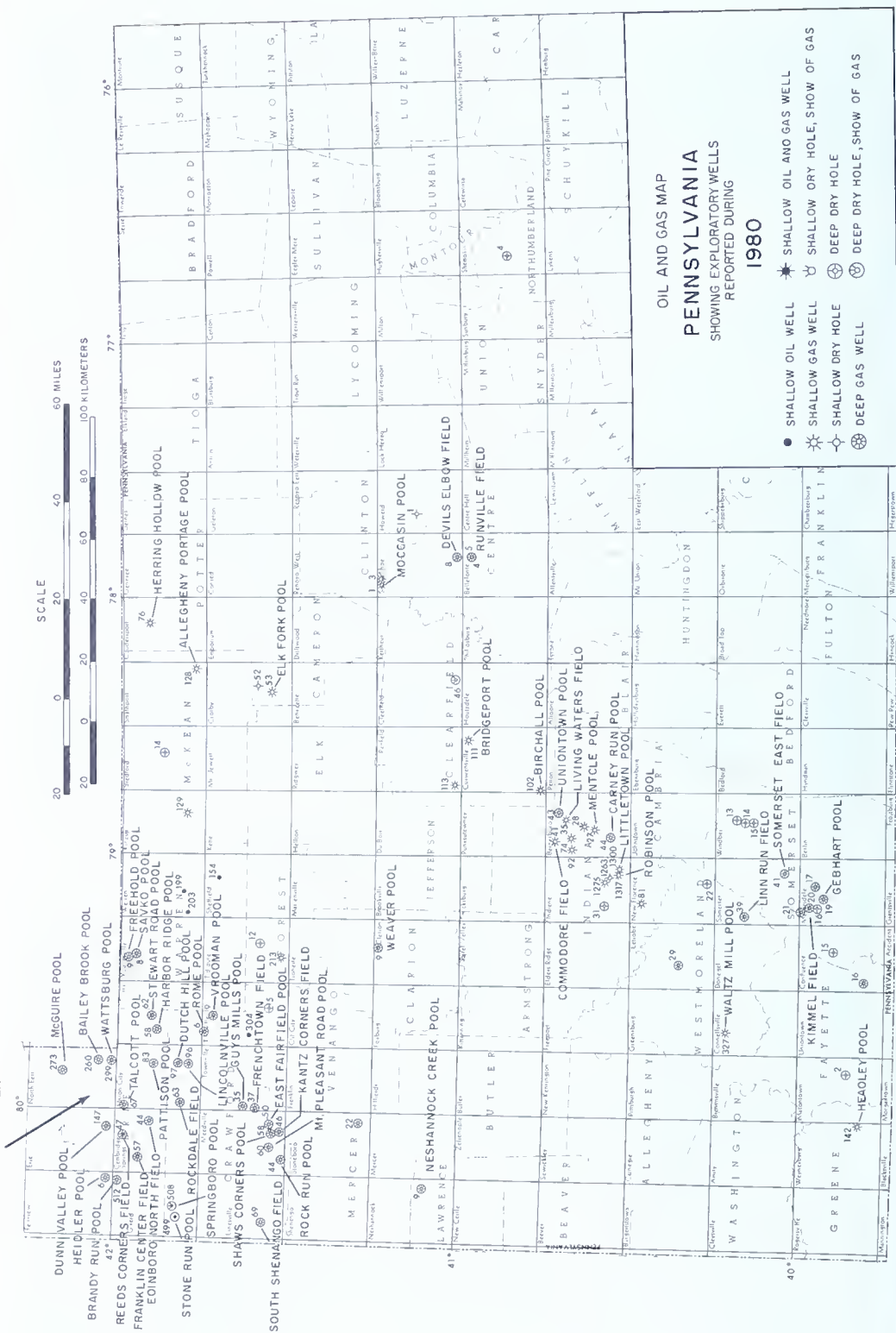


Figure 21. Map of exploratory wells in Pennsylvania reported in 1980

Figure 22. Exploratory and primary development and drilling footages reported, 1980 and 1979

Type of well	1980 Wells	1980 Footage	1979 Wells	1979 Footage	% Change in footage
Exploratory					
Gas.....	102	478,169	52	220,273	
Oil.....	6	13,222	2	3,286	
Oil and gas.....	5	18,101	0	0	
Dry.....	19	121,167	15	62,851	
Total (% successful).....	132 (86%)	630,659	69 (78%)	286,410	+ 120
Development					
Gas.....	998	3,616,576	991	3,466,752	
Oil.....	771	920,630	755	798,541	
Oil and gas.....	19	50,490	6	12,995	
Dry.....	36	111,633	36	117,007	
Total (% successful).....	1,824 (98%)	4,699,329	1,788 (98%)	4,395,295	+ 7
Miscellaneous wells					
Service.....	64	131,287	84	150,678	- 13
TOTAL ALL WELLS DRILLED.....	2,020 (97%)	5,461,275	1,941 (97%)	4,832,383	+ 13

Figure 23. Exploratory drilling in Pennsylvania by classification and type of well, 1980

<i>Classification and type of well</i>	<i>No. of wells</i>	<i>Footage</i>
NEW FIELD WILDCATS		
Gas	14	87,792
Oil and gas	1	3,960
Dry	8	56,954
<i>Subtotal.</i>	23	148,706
NEW POOL WILDCATS		
Gas	28	121,387
Oil	2	7,319
Dry	2	15,361
<i>Subtotal.</i>	32	144,067
DEEPER POOL TESTS		
Gas	5	27,682
Dry	3	11,277
<i>Subtotal.</i>	8	38,959
SHALLOWER POOL TESTS		
Gas	4	15,860
<i>Subtotal.</i>	4	15,860
OUTPOST EXTENSIONS		
Gas	51	225,448
Oil	4	5,903
Oil and gas	4	14,141
Dry	6	37,575
<i>Subtotal.</i>	65	283,067
GRAND TOTAL EXPLORATORY WELLS.	132	630,659

tively. The Gebhart pool, a shallower pool in the Middle Devonian Huntersville Chert, was discovered in the Rockwood field at a depth of 9,019 feet. Initial potentials of these three discovery wells ranged from 1,400 Mcf to 3,000 Mcf after treatment.

Drilling in Centre County was light and restricted to the vicinity of the Devils Elbow field, discovered in the Snow Shoe quadrangle in 1977. The Devils Elbow field discovery, Amoco-UGI #1 Texasgulf, remained an uncompleted tight hole until Summer 1980. The well record reported an estimated 20,000 Mcfgpd natural open flow with an after-treatment open flow of 7,000 Mcfgpd. The gas reportedly contains a large amount of nitrogen. The 7,000 Mcfgpd, therefore, is the net amount of natural gas produced after the nitrogen is removed. The well produces from Lower Silurian Tuscarora Sandstone at a depth of 10,866 feet. Only three other wells were reported from Centre County during 1980; one was a development well in the Devils Elbow field and the other two were exploratory offsets of the field. The Amoco #1 Reuben Griffith was junked and abandoned at 6,884 feet in the Middle Silurian McKenzie Formation. The rig was skidded about 50 feet

and the Amoco #1-A Reuben Griffith was drilled to Tuscarora at 8,611 feet. This well, which had an after-treatment open flow of 2,050 Mcfgpd, was the discovery well for the Runville field.

In Northumberland County, Amoco drilled a significant test of the Eastern Overthrust Belt. The Amoco #1 Wilhour Gas Unit was drilled to a total depth of 14,737 feet in the Cambro-Ordovician (Beekmantown Group?) of the Valley and Ridge province north of Harrisburg. The test resulted in a dry hole.

Onondaga (Middle Devonian) and Oriskany tests in Erie County have resulted in production from these units in what is traditionally a Medina (Lower Silurian) producing area. A new well in the Delhill Corners pool in the North East field extended the known producing zone in the Clarence cherty limestone member of the Onondaga Group. The Envirogas #2 Slaughtenhaupt was drilled to a total depth of 2,449 feet and had an initial potential of 8,600 Mcfgpd natural open flow. The McGuire pool, also in the North East field, was a new Oriskany Sandstone discovery about 12 miles northeast of the Summit Storage pool, an Oriskany gas storage reservoir in the Erie field. The National Fuel Gas #1 McGuire had an initial potential of 4,347 Mcfgpd after treatment from a depth of 2,402 feet.

Medina gas developments in northwestern Pennsylvania continue to dominate deep drilling in the state. Large programs of exploration and development drilling by several companies such as Wainoco Oil and Gas and Cabot Oil and Gas have expanded the known producing areas in Erie and Crawford Counties. From these two counties, 308 Medina wells were reported in 1980; this includes 281 gas wells, 8 oil wells, 12 combination oil and gas wells, and 7 dry holes. As a result of this activity, 29 new fields and pools were discovered (Figures 21 and 24). This trend is expected to continue as operators receive higher price incentives through NGPA.

In the shallow gas belt the most significant development of 1980 was production from the Kane sand (Bradford Group) in the area just west of the town of Cherrytree, Clearfield County. A narrow band of Kane sand in Indiana County was almost anomalously well developed, an apparent channel sandstone having up to 55 feet of 60 percent clean sand as determined from gamma-ray logs. Initial potentials ranging from 700 Mcfgpd to 13,400 Mcfgpd natural open flow occur in wells drilled in a narrow east-west-trending band. The best production occurs where the paleochannel crosses the axis of the Brush Valley syncline, implying that production is influenced by fracture porosity. Exploration in the area is expected to continue through 1981.

Figures 21, 24, and 25 include a map showing locations of selected exploratory wells reported in 1980, a table showing all 1980 new field and new pool discoveries, and a table showing the significant exploratory failures drilled in 1980.

Figure 24. Reported new field and new pool discoveries in Pennsylvania, 1980

County and permit no.	Quadrangle and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T. D. *	Prod. depth (feet)	Prod. formation or zone*	Initial daily prod.	Field or pool name	Explor. class**
Cameron CAM-20064 53	Crosby	National Fuel Gas Supply Corp. #6219 R. W. Howard	10/11/79	2,150	Canadaway (D)	1,281	Canadaway (D)	117 Mcf	Elk Fork pool	NPD
Centre CEN-20014 5	Belleville	Amoco Production Company #1/A Reuben Griffith	2/28/80	8,600	Tuscarora (S)	8,427	Tuscarora (S)	2,050 Mcf	Runville field	NFD
Centre CEN-20006 8	Snow Shoe	Amoco Production/UGI #1 Texasgulf, Inc.	12/18/77	11,187	Tuscarora (S)	10,974	Tuscarora (S)	7,000 Mcf	Devils Elbow field	NFD
Clarion CLA-20819 9	Clarion	Consolidated Gas Supply Corp. #1 A. P. Weaver and Sons	2/22/80	5,843	Helderberg (D)	5,728	Oriskany (D)	60 Mcf	Weaver pool	NPD
Clearfield CLE-20884 102	Curwensville	Consolidated Gas Supply Corp. #1 Bernard Birchall	10/24/79	3,701	Canadaway (D)	3,320	Canadaway (D)	34 Mcf	Birchall pool	NPD
Clearfield CLE-20984 111	Curwensville	Watson and Swanson/Quinta Oil and Gas #1 Norman C. Whitaker	9/12/80	3,616	Canadaway (D)	2,847	Canadaway (D)	512 Mcf	Bridgeport pool	NPD
Clinton CL1-20203 1	Snow Shoe	Jay-Bee Oil and Gas Company #2 F. D. Winner	9/12/79	4,550	Catskill (D)	4,335	Catskill (D)	60 Mcf	Moccasin pool	NPD
Crawford CRA-20616 499	Girard	Cardinal Oil Company #1 O. Hammermeister	11/2/79	3,661	Queenston (O)	3,510	Medina (S)	17.5 Mcf 9 BO	Stone Run pool	NPD
Crawford CRA-20645 508	Girard	Center Bar Gas Company #5 Serbian Orthodox	11/7/79	3,658	Queenston (O)	3,582	Medina (S)	74 Mcf 4 BO	Springboro pool	NPD
Crawford CRA-20593 69	Linesville	P. O. I. Energy, Inc. #1 Norris B. Head Estate	8/9/79	7,163	Gatesburg (C-O)	4,315	Medina (S)	100 Mcf	South Shenango field	NFD
Crawford CRA-20525 44	Meadville	N-Ren Corporation #1 Frank and Helen Bitenc	6/27/77	5,054	Queenston (O)	4,982	Medina (S)	1,000 Mcf	Rock Run pool	NPD
Crawford CRA-20533 46	Meadville	N-Ren Corporation #1 Wilbur Dunn Estate	7/26/77	5,144	Queenston (O)	5,140	Medina (S)	1,000 Mcf	Kantz Corners field	NFD
CRA-20699 50	Meadville	Cabot Oil and Gas Corporation #1 Robert Morrell	7/31/80	5,240	Queenston (O)	5,137	Medina (S)	1,100 Mcf	East Fairfield pool	NPD
Crawford CRA-20698 58	Meadville	Cabot Oil and Gas Corporation #1 William Prather	7/15/80	5,088	Queenston (O)	5,027	Medina (S)	1,008 Mcf	Shaws Corners pool	NPD
CRA-20727 60	Meadville	Cabot Oil and Gas Corporation #1 Harry Zimmer	8/30/80	5,100	Queenston (O)	5,028	Medina (S)	696 Mcf	Mt. Pleasant Road pool	NPD
Crawford CRA-20582 6	Titusville	Wainoco Oil and Gas Company #1 Hubert Vanderhoff	6/9/79	5,389	Queenston (O)	5,214	Whirlpool (S)	3,364 Mcf	Rome pool	NPD
Crawford CRA-20647 9	Titusville	Wainoco Oil and Gas Company #1 N. & D. Hasbrouck	12/7/79	5,455	Queenston (O)	5,341	Medina (S)	764 Mcf	Vrooman pool	NPD

Crawford	Townville	Cabot Oil and Gas Corporation	8/26/80	5,245	Queenston	5,126	Medina	462 Mcf	Guys Mills pool	NPD
CRA-20728	35	#1 Noah Wengert			(O)		(S)			
Crawford	Townville	Cabot Oil and Gas Corporation	8/17/80	5,317	Queenston	5,202	Medina	1,032 Mcf	Frenchtown field	NFD
CRA-20738	37	#1 Joseph Mullet			(O)		(S)			
Crawford	Union City	Meridian Exploration Corp.	11/30/79	4,297	Queenston	4,186	Whirlpool	544 Mcf	Rockdale field	NFD
CRA-20634	63	#1 James H. Zilhaber			(O)		(S)			
Crawford	Union City	Wainoco Oil and Gas Company	8/16/80	4,658	Queenston	4,591	Medina	311 Mcf	Lincolnton pool	NPD
CRA-20787	96	#1 Seth P. Ballog			(O)		(S)			
Crawford	Union City	Wainoco Oil and Gas Company	8/31/80	4,841	Queenston	4,708	Medina	381 Mcf	Dutch Hill pool	NPD
CRA-20797	97	#1 Joseph W. Miller			(O)		(S)			
Erie	Cambridge Springs	Meridian Exploration Corp.	1/7/80	4,040	Queenston	3,938	Whirlpool	861 Mcf	Edinboro North field	NFD
ERI-20885	44	#1 Helen Stafford			(O)		(S)			
Erie	Cambridge Springs	Mutual Oil and Gas	7/16/80	3,960	Queenston	3,748	Medina	21 Mcf	Reeds Corners field	NFD
ERI-21017	47	#3 Robert M. Tracy			(O)		(S)			
Erie	Cambridge Springs	Great Lakes Hydrogas, Inc.	6/16/80	3,795	Queenston	3,676	Medina	627 Mcf	Franklin Center field	NFD
ERI-21038	57	#1 M. & R. Seidel			(O)		(S)			
Erie	Corry	Appalachian Energy, Inc.	10/2/79	4,798	Queenston	4,760	Medina	500 Mcf	Harbor Ridge pool	DPD
ERI-20862	58	#1 Herbert Morton			(O)		(S)			
Erie	Corry	Appalachian Energy, Inc.	3/10/80	4,731	Queenston	4,620	Medina	500 Mcf	Stewart Road pool	DPD
ERI-20953	62	#1 Leo Spitzman			(O)		(S)			
Erie	Erie	Envirogas, Inc.	1/19/80	3,797	Queenston	3,692	Medina	551 Mcf	Dunn Valley pool	NPD
ERI-20944	147	#1 Julia Wasielewski			(O)		(S)			
Erie	Fairview	Envirogas, Inc.	5/22/79	3,006	Queenston	2,904	Medina	250 Mcf	Heidler pool	NPD
ERI-20690	6	#1 Ralph Heidler, et al.			(O)		(S)			
Erie	Girard	Envirogas, Inc.	5/28/79	3,119	Queenston	3,024	Medina	200 Mcf	Brandy Run pool	NPD
ERI-20736	512	#1 Theodore D. Willis			(O)		(S)			
Erie	North East	Envirogas, Inc.	1/11/80	3,909	Queenston	3,812	Medina	2,300 Mcf	Bailey Brook pool	NPD
ERI-20928	260	#1 Lawrence Brumagin			(O)		(S)			
Erie	North East	National Fuel Gas Supply Corp.	2/8/80	2,520	Keyser	2,402	Oriskany	4,347 Mcf	McGuire pool	SPD
ERI-20949	273	#6225 G. H. McGuire			(D-S)		(D)			
Erie	North East	Vineyard Oil and Gas Company	4/19/80	3,868	Queenston	3,795	Medina	not given	Wattsburg pool	NPD
ERI-20963	299	#1 Walter Rothoff			(O)		(S)			
Erie	Union City	JAB Enterprises	7/19/79	3,808	Queenston	3,734	Medina	400 Mcf	Talcott pool	NPD
ERI-20821	67	#1 Ronald J. Finch			(O)		(S)			
Erie	Union City	Union Drilling, Inc.	11/9/79	4,424	Queenston	4,316	Medina	712 Mcf	Pattison pool	NPD
ERI-20903	83	#1 C. and P. Pattison			(O)		(S)			
Greene	Waynesburg	Peoples Natural Gas Company	1/24/80	1,680	Big Injun	1,680	Big Injun	8,690 Mcf	Headley pool	DPD
GRE-21496	142	#1 Frank R. Headley			(D)		(D)			
Indiana	Barnesboro	A. F. Carino Interest	9/20/79	3,571	Canadaway	3,552	Canadaway	not given	Mentcle pool	NPD
IND-24986	27	#1 A. F. Carino			(D)		(D)			
Indiana	Barnesboro	Consolidated Gas Supply Corp.	11/4/79	3,988	Canadaway	3,796	Canadaway	91 Mcf	Living Waters field	NFD
IND-24970	35	#1 J. Clyde Johns			(D)		(D)			

Figure 24. (Continued)

County and permit no.	Quadrangle and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T. D.*	Prod. depth (feet)	Prod. formation or zone*	Initial daily prod.	Field or pool name	Explor. class**
Indiana IND-25202	Barnesboro 41	Keystone Energy #2 W. A. Schroth	12/23/79	3,743	Canadaway (D)	3,518	Canadaway (D)	153 Mcf	Commodore field	NFD
Indiana IND-25151	Barnesboro 43	Consolidated Gas Supply Corp. #1 Barbara Anderson	2/21/80	8,459	Helderberg (D)	8,279	Huntersville Chert (D)	1,007 Mcf	Uniontown pool	DPD
Indiana IND-25437	Barnesboro 44	Consolidated Gas Supply Corp. #1 T. M. Berringer	4/28/80	8,678	Helderberg (D)	8,352	Huntersville Chert (D)	424 Mcf	Carney Run pool	NPD
Indiana IND-25455	Indiana 1300	Mid-East Oil Company #1 Mildred R. Simpson	11/24/79	8,014	Canadaway (D)	3,990	Canadaway (D)	1,163 Mcf	Littletown pool	NPD
Indiana IND-25402	Indiana 1317	Felmont Oil Corporation #1 Ronald M. Little	6/14/80	3,820	Canadaway (D)	3,636	Canadaway (D)	325 Mcf	Robinson pool	NPD
Lawrence LAW-20022	Neshannock 9	Peoples Natural Gas Company #1 Connie Sokevit	12/14/79	4,202	Onondaga (D)	4,130	Marcellus (D)	133 Mcf	Neshannock Creek pool	NPD
McKean MCK-38689	Smethport 128	Quaker State Oil #01 W. Coyote	7/17/80	1,735	Canadaway (D)	1,725	Canadaway (D)	100 Mcf	Allegheny Portage pool	NPD
Porter POT-20568	Coudersport 76	Quaker State Oil #01 Blauvelt	7/12/79	1,890	Canadaway (D)	957	Canadaway (D)	300 Mcf	Herring Hollow pool	NPD
Somerset SOM-20093	Meyersdale 19	Amoco Production Company #1 Theodore C. Sipe	11/26/79	9,019	Helderberg (D)	8,770	Huntersville Chert (D)	150 Mcf	Gebhart pool	SPD
Somerset SOM-20097	Meyersdale 20	Amoco Production/Ashtola Production #2 Matthew Luce	5/9/80	9,071	Helderberg (D)	8,993	Oriskany (D)	1,400 Mcf	Kimmel field	NFD
Somerset SOM-20083	Somerset 41	Amoco Production Company #1 Levi Berkey	10/7/79	9,125	Helderberg (D)	9,047	Oriskany (D)	3,000 Mcf	Somerset East field	NFD
Warren WAR-28264	Youngsville 8	Jennifer Petroleum, Ltd. #1A Savko	9/5/80	4,970	Queenston (O)	4,874	Medina (S)	396 Mcf	Savko pool	NPD
Warren WAR-28015	Youngsville 9	Cumberland Oil Corporation #1 John Mallory	8/5/80	4,800	Queenston (O)	4,667	Medina (S)	550 Mcf	Freehold pool	NPD
Westmore-land WES-21477	Connellsville 39	Westinghouse Electric Corp. #4 Fee	10/19/79	750	Pottsville (P)	658	Allegheny and Pottsville (P)	35 Mcf	Waltz Mill pool	SPD
Westmore-land WES-21309	Somerset 327	Peoples Natural Gas Company #1 Mellon Bank, N. A.	4/25/79	8,120	Helderberg (D)	8,052	Oriskany (D)	7,000 Mcf	Linn Run field	NFD

* (P) = Pennsylvanian; (D) = Devonian; (D-S) = Devonian-Silurian; (S) = Silurian; (O) = Ordovician; (C-O) = Cambro-Ordovician
 **NFD = new field discovery; DPD = deeper pool discovery; SPD = shallower pool discovery

Figure 25. Selected exploratory failures reported in Pennsylvania, 1980

County and permit no.	Quad. and map no.	Operator well no. and lease	Completion date (M-Day-Y)	Total depth (feet)	Name of formation at T.D.*	Explor. class**
Cameron	Crosby	National Fuel Gas Supply Corp.	8/24/79	2,129	Canadaway	NFW
CAM-20063	52	#6218 Seneca Resources			(D)	
Centre	Bellefonte	Amoco Production Company	11/ 7/79	6,884	Salina	NPW
CEN-20012	4	#1 Reuben Griffith			(S)	
Clearfield	Clearfield	Texaco, Inc.	8/12/80	7,950	Helderberg	NFW
CLE-20970	46	#1 Boyd G. Peters			(D)	
Crawford	Meadville	Cabot Oil and Gas Corp.	8/ 6/80	5,320	Queenston	NFW
CRA-20722	59	#1 Walter Pearl			(O)	
Forest	Tidioute	John A. Vertullo	3/ 8/79	5,965	Medina	DPT
FOR-22185	12	DJV-0001 Lot 5200			(S)	
Indiana	Indiana	Angerman Gas Venture	11/24/79	8,014	Hamilton	DPT
IND-25073	31	#5 Glenn E. McCall			(D)	
McKean	Bradford	Minard Run Exploration Co.	3/16/79	5,208	Onondaga	DPT
MCK-37291	14	#1 Minard Run Oil Co.			(D)	
Northumberland	Shamokin	Amoco Production Company	3/29/80	14,737	Cambro-Ordovician	NFW
NOR-20002	4	#1 Wilhour Gas Unit			(C-O)	
Somerset	Confluence	Amoco Production/UGI Corp.	10/23/78	8,278	Oriskany	NFW
SOM-20071	15	#1 PA Tract 111-A			(D)	
Somerset	Meyersdale	Amoco Prod./Ashtola Prod.	8/ 5/79	9,310	Helderberg	NFW
SOM-20086	16	#1 Matthew B. Luce			(D)	
Somerset	Windber	Amoco Prod./Ashtola Prod.	3/12/80	9,140	Helderberg	NFW
SOM-20089	15	#1 D. D. Shaffer			(D)	
Venango	Titusville	Pennzoil Company	1/ 3/80	4,505	Onondaga	DPT
VEN-27187	5	#1 Hubbard			(D)	
Westmoreland	New Florence	Peoples Natural Gas Company	10/19/79	8,477	Keyser	NPW
WES-21557	22	#2 Constance Prosser Burrell			(S)	

* (D) = Devonian; (S) = Silurian; (O) = Ordovician; (C-O) = Cambro-Ordovician

** NFW = new field wildcard; NPW = new pool wildcard; DPT = deeper pool test

PROJECTS IN PROGRESS IN 1980, OIL AND GAS GEOLOGY DIVISION

OIL AND GAS BASE MAP PROGRAM

Thirty-four base maps showing locations of oil and gas wells and the outlines of oil, gas, and gas storage fields are available (see Figure 26 for an index map of the area covered). Each base map encompasses four 15-minute topographic quadrangles at a scale of 1:62,500 (one inch equals approximately 1 mile). A 5-minute grid, quadrangle names, county boundaries, and major rivers and towns make up the background of the base map. All known deep wells (wells that penetrate Middle Devonian or older rocks) and those shallow wells (wells not reaching Middle Devonian) on record with the Survey are located. Status (dry, oil, gas, abandoned, etc.) of each, and elevation and total depth of selected wells are shown. Symbols indicate whether borehole geophysical logs and sample data are on file in the Survey's Oil and Gas Geology Division office in Pittsburgh. An index map near the legend shows the outlines of oil, gas, and gas storage fields within the mapped area, thus indicating the extent of areas of pre-1956 drilling. A list of field names is also included. All maps were updated in 1980.

Paper prints of the base maps may be obtained by writing to the State Book Store, P. O. Box 1365, Harrisburg, Pennsylvania 17125. The cost of each base map is \$0.50, plus 6 percent sales tax to Pennsylvania residents. A check for the appropriate total amount, made payable to the Commonwealth of Pennsylvania, must accompany the order. When ordering, please specify the map number.

A cross index of state permit numbers and quadrangle map numbers used on the base maps is available from the Oil and Gas Geology Division of the Pennsylvania Geological Survey, 1201 Kossman Building, 100 Forbes Avenue, Pittsburgh, Pennsylvania 15222. The index is arranged by quadrangles. Please specify the quadrangle when requesting this information.

OPEN-FILE REPORTS AND OTHER DATA AVAILABLE

The following reports and other data are available on open file at the Pennsylvania Geological Survey, Oil and Gas Geology Division, 1201 Kossman Building, 100 Forbes Avenue, Pittsburgh, Pennsylvania 15222.

- (1) *Surface to Middle Devonian (Onondagan) Stratigraphy, Part I (STOMDES)*, 1972, by D. R. Kelley and W. R. Wagner, 15 p., 8 cross sections, vertical scale 1 inch = 100 feet.
- (2) *Deep Sand Exploration and Gas Developments in Pennsylvania*, 1973, by Lillian A. Heeren, 1 map, scale 1:500,000 (updated periodically).

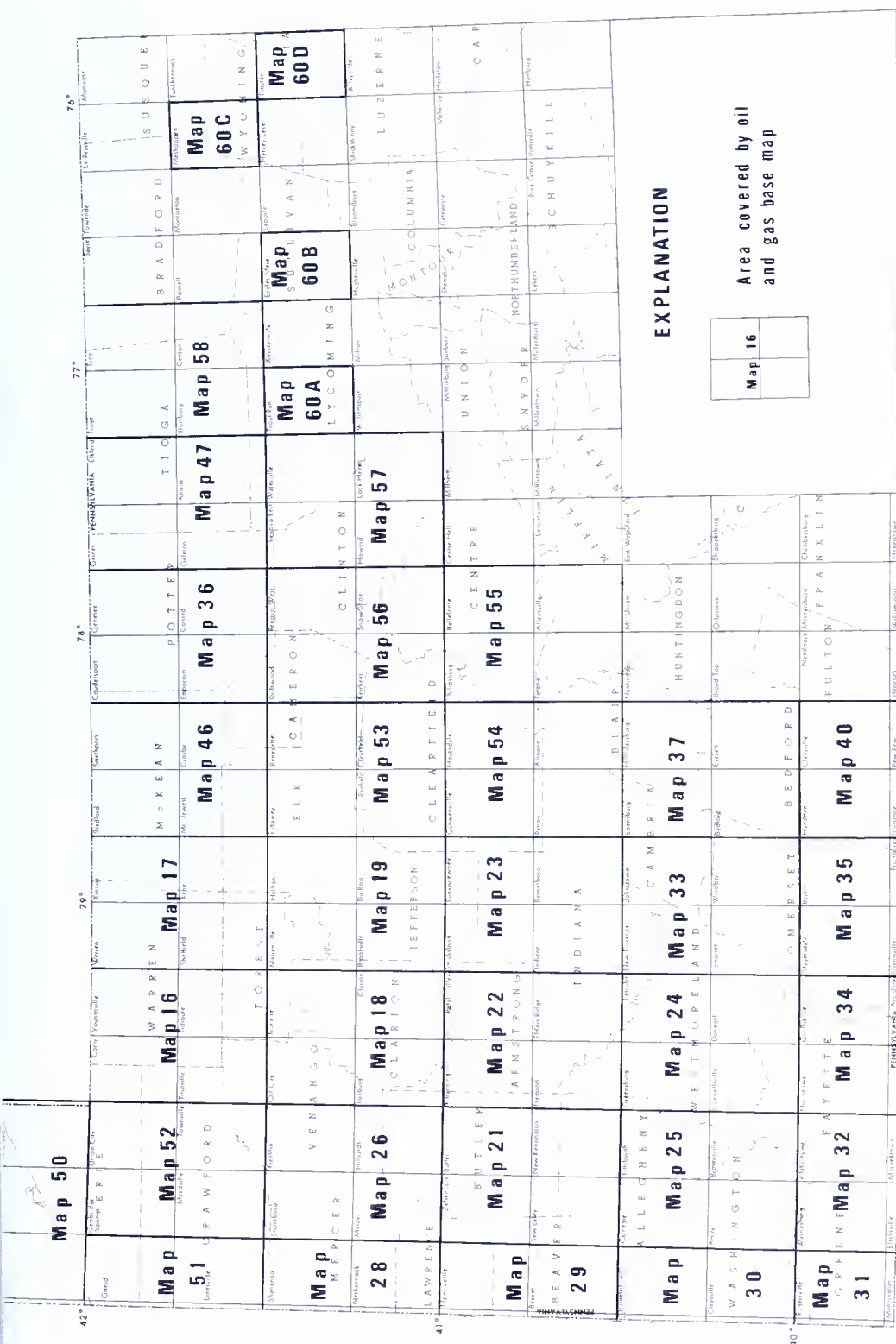


Figure 26. Index of available subsurface base maps

- (3) *Salina or Equivalent and Deeper Penetrations of Pennsylvania*, 1973, by D. R. Kelley and L. J. Balogh, 1 map, scale 1:500,000 (updated periodically).
- (4) *Tully and Deeper Formations, Brine Analysis of Pennsylvania*, 1973, by D. R. Kelley and L. A. Heeren, 1 chart and map, scale 1:500,000.
- (5) *Stratigraphic Framework of the Greater Pittsburgh Area, Parts I and II*, 1972, by W. R. Wagner and W. S. Lytle, 20 p., 9 sections in 13 sheets.
- (6) *Active Gas Storage Fields Map of Pennsylvania*, L. J. Balogh, 1 map, scale 1:500,000.
- (7) *Subsurface Rock Correlation Diagram, Allegheny Plateau, Pennsylvania*, 1979, by J. A. Harper.

Also on open file at the Pennsylvania Geological Survey's Pittsburgh office are over 30,140 drillers' logs, along with 3,170 mechanical logs; a sample library containing drill cuttings from approximately 1,200 wells, 90 of which are out-of-state wells; and a core library containing cores of 34 wells.

ACTIVITIES OF THE OIL AND GAS REGULATION DIVISION

SUMMARY OF REGULATORY FUNCTIONS

The Oil and Gas Regulation Division administers several different laws affecting the oil and gas industry. Act 225 regulates the permitting of oil and gas wells, the underground storage of gas, mining around wells, and the methods of casing and plugging of oil and gas wells. Act 359, known as the Oil and Gas Conservation Law, concerns only those wells that meet two specific requirements: (1) a depth of 3,800 feet or deeper; and (2) penetration of the Middle Devonian Onondaga Group. The Oil and Gas Conservation Law provides for spacing of oil and gas wells, unitization, and protection of the rights of oil and gas owners. Act 38 relates to underground gas storage and to the rights and protection of persons living within underground gas storage areas.

Figures 27 and 28 summarize the work of the Division of Oil and Gas Regulation during 1980.

ACTIVITIES OF THE NATURAL GAS POLICY ACT (NGPA) SECTION

The Natural Gas Policy Act (NGPA) is part of the national energy program signed into law in 1978. The purpose of the act is to provide for the gradual deregulation of natural gas prices by 1985. The Oil and Gas Regula-

Figure 27. Summary of activities of the Oil and Gas Regulation Division, 1956-1980

	Cumulative from												Grand Total 1956-1980
	1956-1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	
1. Drilling permits issued in coal areas	4,394	322	342	469	694	648	916	782	1,166	1,429	1,332	1,359	13,853
2. Drilling permits issued in coal areas, Act 359	224	16	10	16	11	15	26	12	27	21	42	23	443
3. Total wells in coal areas (items 1 and 2)	4,618	338	352	485	705	663	942	794	1,193	1,450	1,374	1,382	14,296
4. Drilling permits issued in noncoal areas	1,103	914	956	1,247	1,522	1,364	1,042	1,381	1,510	1,806	2,348	5,079	20,272
5. Drilling permits issued in noncoal areas, Act 359	214	9	12	37	61	34	23	15	51	93	182	482	1,213
6. Total permits issued (items 3, 4, and 5)	5,935	1,261	1,320	1,769	2,288	2,061	2,007	2,190	2,754	3,349	3,904	6,943	35,781
7. Reported wells in noncoal areas—file numbers issued	8,202*	27*	2*	10*	0	0	0	0	0	0	0	0	8,241*
8. Total wells in noncoal areas (items 4, 5, and 7)	9,519	950	970	1,294	1,583	1,398	1,065	1,396	1,561	1,899	2,530	5,561	29,726
9. Total wells in coal and noncoal areas (items 6 and 7)	14,137	1,288	1,322	1,779	2,288	2,061	2,007	2,190	2,754	3,349	3,904	6,943	44,022
10. Total drilling permits issued, Act 359 (items 2 and 5)	438	25	22	53	72	49	49	27	78	114	224	505	1,656
11. Drilling cancelled permits and noncoal file numbers	1,108	244	236	169	327	597	383	667	469	412	467	616	5,695
12. Plugging numbers issued	6,374	1,721	1,383	1,860	1,681	1,511	1,630	1,959	1,300	2,057	1,225	1,069	23,770
13. Plugging numbers cancelled	318	119	116	83	180	112	119	92	71	60	66	25	1,361
14. Wells reported plugged and abandoned	5,142	992	1,573	1,317	1,410	1,089	1,284	1,493	1,144	991	1,307	959	18,701
15. Pillar permits issued	2,131	164	105	142	96	96	94	104	125	83	150	141	3,431
16. Pillar permits cancelled	18	0	0	1	0	1	0	2	0	0	0	0	22

Act 359 of 1961—Oil and Gas Conservation Law, approved July 25, 1961. Effective date September 25, 1961.

* Prior to September 30, 1968, permits were not required for wells in noncoal areas, except those wells coming within purview of Act 359 of 1961.

Act 265, approved July 31, 1968, effective September 30, 1968—requires permits to be issued for all wells.

Figure 28. Summary of activities of the Oil and Gas Regulation Division by county, 1980

County	Permits		Drilling cancelled	Plugging numbers issued	Wells		DRILLING PERMITS ISSUED Act 359 of 1961		
	issued in coal areas	issued in noncoal areas			Plugging cancelled	reported plugged and abandoned	Pillar permits issued	Coal areas	Noncoal areas
Allegheny	21	2	8	6	0	4	12	0	0
Armstrong	93	8	41	3	0	2	28	0	0
Beaver	4	9	0	3	0	1	0	0	0
Butler	32	15	3	11	0	3	0	0	0
Cambria	10	0	1	0	0	0	0	1	0
Cameron	0	3	0	2	0	2	0	0	1
Centre	0	0	0	0	0	1	0	0	0
Clarion	32	54	12	13	1	12	0	1	1
Clearfield	87	1	30	3	0	2	1	0	1
Clinton	1	60	2	1	0	0	0	1	0
Crawford	0	315	5	3	0	1	0	0	213
Elk	2	108	0	39	0	24	0	0	1
Erie	0	332	35	7	0	7	0	0	194
Fayette	13	3	19	12	0	3	0	0	1
Forest	0	693	24	77	0	61	0	0	0
Greene	24	0	0	10	1	15	48	0	0
Indiana	692	0	72	17	0	6	23	3	0
Jefferson	169	56	49	21	0	20	4	0	0
Lackawanna	0	0	0	3	0	0	0	0	0
Lawrence	0	2	0	0	0	0	0	0	0
Luzerne	0	1	0	0	0	0	0	0	0
McKean	0	655	115	598	21	579	0	0	0
Mercer	2	13	0	0	0	0	0	1	6
Northumberland	0	0	0	1	0	1	0	0	0
Potter	0	60	0	6	0	0	0	0	0
Somerset	14	3	3	6	0	8	0	14	3
Tioga	0	8	6	0	0	0	0	0	1
Venango	1	1,990	61	161	1	177	0	0	0
Warren	0	1,166	30	48	0	13	0	0	60
Washington	30	4	17	6	0	5	21	0	0
Westmoreland	155	0	83	12	1	12	2	2	0
TOTAL	1,382	5,561	616	1,069	25	959	139	23	482

tion Division, Bureau of Topographic and Geologic Survey, Pennsylvania Department of Environmental Resources, was empowered to review well classification applications for NGPA as required by the Federal Energy Regulatory Commission (FERC). The staff of the NGPA section of the division processes applications for NGPA well classifications by examining data submitted by each applicant to justify the category for which he seeks a determination. The staff is involved with making determinations of four basic well categories: (1) new natural gas; (2) new onshore natural gas; (3) high-cost natural gas; and (4) stripper well. Three of these categories have subcategories, each with its own price ceiling set by federal law. The staff reviews each application to determine whether the data submitted are sufficient to meet the NGPA requirements for the preferred classification.

A backlog of approximately 400 applications is on file, and more applications continue to be filed every day. A \$30.00 filing fee to cover the state cost of administering the program is required for each well determination application. In addition, a FERC form and Pennsylvania forms must be completed and submitted along with geologic, engineering, and production data to support the requested classification.

Figure 29 lists the actions taken by the staff in making well classification determinations for the year of 1980.

Figure 29. Well-classification determinations made under the Natural Gas Policy Act

<i>No. of applications</i>	<i>Category</i>	<i>Approved</i>	<i>Disapproved</i>
307	102	300	7
1,597	103	1,568	29
2,833	108	2,770	63

SUMMARIZED RECORDS OF REPORTED DEEP WELLS* IN 1980

The information in Figure 36 has been compiled mainly from drillers' logs, location plats, and geophysical logs received from the Oil and Gas Regulation Division. Other sources are the Petroleum Information Corporation (PI) and personal communications with oil and gas operators. Well records are filed with the Oil and Gas Regulation Division by permit numbers. The Oil and Gas Geology Division assigns a file number which appears on the Survey's published and open-file maps.

*Wells that penetrate rocks of Middle Devonian or older age

A single asterisk appearing on a record indicates that all formation tops and total depths were picked from a geophysical log. A record having no asterisk means that the formation tops and total depths are from the drillers' log or PI. A double asterisk precedes the 7-1/2-minute quadrangle name and location. The tables are listed alphabetically by county and numerically by permit number.

REVIEW OF THE 1970's AND PROSPECTIVE TRENDS FOR THE 1980's

INTRODUCTION

The decade of the 1970's was one of turmoil and instability in the world petroleum business. Nationalization of industry, oil embargoes, unstable governments, the establishment of the Organization of Petroleum Exporting Countries (OPEC), and rising prices became the legacy of oil in the 1970's. The threat of the "energy crisis" had special importance for the United States, where greatly increased crude oil prices (world crude prices quadrupled between October 1973 and May 1974) spelled near catastrophe for the average citizen. In a nation where fuel prices were kept artificially low for years, an almost overnight change in energy consumption habits was required. People began driving less, bought smaller or more fuel efficient cars, turned thermostats down in the winter and up in the summer, and watched as gasoline prices soared from \$0.30 per gallon to over \$1.00 per gallon.

If the 70's were times of economic and political instability in the marketplace, they were also times of renewed activity in exploration and development of domestic resources. U. S. oil production had peaked in 1970, and inexpensive imports began to replace domestic supplies. However, with the sharp turn of events in 1973, decontrol of crude oil prices began at home and spurred the industry to look for new resources. The Natural Gas Policy Act of 1978 was enacted to provide for a gradual move toward total gas deregulation by 1985. In the meantime the U. S. Department of Energy (DOE), established in 1977, began a program of funding research in alternate energy sources. Development of solar power and wind, wave, and geothermal sources were encouraged. The development of gasohol, gasoline cut with methyl alcohol, was another pet project of DOE. Enhanced oil recovery projects and unconventional natural gas sources were strongly endorsed and received DOE financial aid. Research began on Devonian shale gas, coal gasification, western tight sands, and oil shales and tar sands.

In Pennsylvania the story was similar. The increases in oil and natural gas prices spurred industry to drill more than ever. Only 1,015 wells were drilled in Pennsylvania in 1970, down 14 percent from the previous year, whereas

in 1979, 1,941 wells were reported for an increase of 91 percent over the beginning of the decade. Geologic formations and geographic areas previously ignored became targets for leasing and drilling. Numerous fields were discovered in the Medina Group (Lower Silurian) in Erie and Crawford Counties as the prospect of higher prices under NGPA loomed. Amoco Production Company began a long-term exploration and development program in search of deep gas in the Oriskany Sandstone (Lower Devonian) and Tuscarora Sandstone (Lower Silurian), particularly in the almost unexplored belt along the eastern edge of the Allegheny Plateau. During the course of this program they made numerous significant discoveries and drilled the deepest well in the Appalachian basin. Other significant actions took place in the shallow oil and gas fields, expanding known producing areas and discovering new oil and gas reserves. All of this has provided stimulation for increased exploration and development of petroleum reserves in the coming years. The following discussion, therefore, is a summary of the drilling and production activities of the 1970's, and speculation on the possible exploratory targets of the 1980's.

THE 1970'S IN REVIEW

Oil Developments

Figure 30 shows the areas of Pennsylvania that were most active in oil well drilling during the 1970's. These areas accounted for most of the 138 percent increase in drilling over the 1960's (Figure 31). The increase, although gradual throughout the decade, was due mainly to the sharp increase in prices for new and stripper oil which became effective in November 1973. Despite the price for new oil, most of the drilling increase was in the established stripper producing belt, from areas and horizons of previously marginal production. Significantly, very few wildcats were drilled. Almost all of the crude oil production in Pennsylvania comes from Upper Devonian sandstones of the Venango and Bradford Groups. One exception is 642,000 barrels of crude oil produced from the Medina Group sandstones of Erie and Crawford Counties. Medina oil was originally designated Corn-ing Grade Crude; however, since 1977 all crude oil produced in Pennsylvania, regardless of the producing horizon, has been designated Penn Grade Crude.

Although secondary recovery (waterflooding and gas injection) of crude oil began in the 1920's, oil production in Pennsylvania has been declining fairly steadily since reaching a peak in the late 1930's. Waterflooding in the Bradford field accounted for more than half of all Pennsylvania oil production during the 70's. Wells drilled for secondary recovery increased only slightly over the decade. The 114 service wells drilled in 1974 were the most in any one year. All the same, production has continued to decline (see

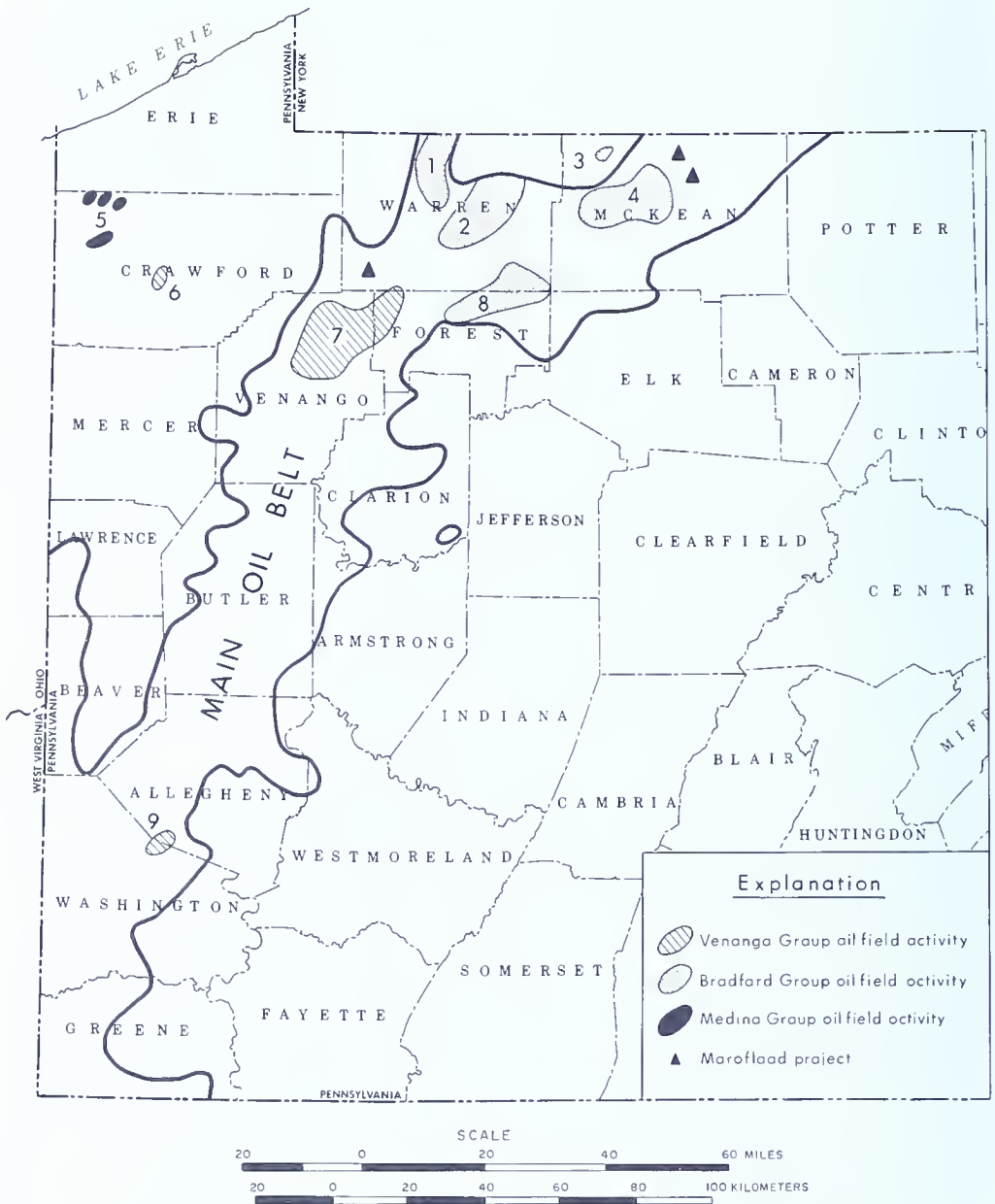


Figure 30. Areas of oil activity, 1970-1979

1. Youngsville and Sugar Grave fields: Glade sand
2. Warren area fields: Glade, Clarendan sands
3. Willaw Creek-Cobb Hallow field: Dewdrop sand
4. Brodford oreo fields: Bradford Second, Chipmunk, Bradford Third sands
5. Conneout field: Medina Group
6. Vernon field: Venanga Third sand
7. Oil City oreo fields: Venanga Group sands
8. Bolltown, Coaper, and Kane oreo fields: Bradford Group sands
9. Canonsburg field: Gantz sand

Figure 31. Number of oil and gas wells drilled in Pennsylvania

	<i>1950's</i>	<i>1960's</i>	<i>1970's</i>
Average number of oil wells per year	28	246	585
Average number of shallow gas wells per year	238	180	524
Average number of deep gas wells per year	139	98	51

Figure 32) from 4 million barrels in 1970 to less than 3 million barrels in 1979. The only really bright spot in this rather gloomy picture is that oil reserve estimates, after declining in the early 1970's, have begun to increase again. The reserve estimates in 1979 were less than 1 percent lower than they were in 1970.

Many secondary recovery projects were started in the 1970's to recover oil from the lower permeability Upper Devonian sands in the marginal areas. In addition, several Maraflood* projects were attempted in the northern oil fields. Figure 30 shows the location of the Maraflood projects in Pennsylvania in the 1970's. One such project, the Penn Grade Micellar Displacement Project, or Lawry Project as it is known locally, was begun in the Bradford field in 1975. It is a joint program sponsored by DOE, the Pennzoil Company, the Quaker State Oil Refining Corporation, and the Witco Chemical Corporation; the actual tests have been carried out by Pennzoil. In the program, a micellar-polymer flooding process is used to recover oil from the previously waterflooded Bradford Third sand. Results of the process are encouraging. As of December 1979, the project had produced 10,399 barrels of oil, almost half of it during 1979 while in the polymer "body" phase (Linville, 1980).

Although the Lower Silurian Medina sandstones accounted for only 2 percent of the total Pennsylvania production during the 70's, the Medina should not be taken lightly as an oil reservoir. Two new pools discovered in 1979 in the Conneaut field, Crawford County, as well as numerous development and extension wells in the same area, produced oil from the Medina. The two pools, Stone Run and Springboro, have gas-producing capabilities as well as oil.

Gas Developments

Natural gas production and consumption in Pennsylvania during the 70's are shown in Figure 7. In addition, gas production and reserve figures are shown in Figure 32. During the 70's production increased almost 25 percent from 79 to 96 billion cubic feet per year, and reserves increased 63 percent. The estimated proved recoverable reserves for the 1960's averaged about

*Maraflood is a trade name of Marathon Oil Company.

Figure 32. Oil and gas production in Pennsylvania in the 1970's

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Oil production (in 1,000 bbl)	4,015	3,798	3,441	3,282	3,399	3,199	2,950	2,659	2,820	2,817
Oil reserves (in 1,000 bbl)	51,283	47,486	37,345	39,613	50,414	48,028	50,563	49,334	48,156	50,845
Gas production (in MMcf)	77,535	76,451	73,958	78,514	82,735	84,772	89,974	92,293	97,763	96,313
Gas reserves (in Bcf)	1,378	1,396	1,407	1,497	1,492	1,682	1,652	1,885	2,094	2,251

Figure 33. Underground gas storage in Pennsylvania in the 1970's

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Gas in storage (in MMcf)	584,959	615,807	606,941	647,041	585,789	596,324	512,861	556,264	582,260	633,494
Storage capacity (in Bcf)	710,038	752,698	763,183	783,450	728,110	755,497	753,497	757,860	642,000	757,610

780 billion cubic feet per year, whereas in the 1970's this average increased to about 1,670 billion cubic feet per year.

Figure 7 shows that natural gas in storage increased sharply over the decade, though not so sharply as reserves. There was an 8 percent increase in stored gas from 1970 to 1979 and a 7 percent increase in storage capacity. Figure 33 gives yearly figures for gas storage and storage capacity in Pennsylvania for the 1970's. Storage reservoirs are diverse. The majority of storage facilities are in Upper Devonian Venango and Bradford Group sandstones, whereas the larger storage facilities, such as those in Leidy field in Clinton and Potter Counties, are in Lower Devonian Oriskany Sandstone. Reservoirs as high in the stratigraphic section as the Pennsylvanian Allegheny Group (Majorsville storage pool, West Finley field, Greene County) and as low in the section as the Lower Silurian Medina Group (Corry storage pool, Corry field, Erie County) are presently being used for natural gas storage. See Lytle (1963) for a report on underground gas storage in Pennsylvania.

Shallow Gas

Figure 34 shows the areas of most intense shallow gas activity during the 1970's. Most of the activity was centered in Indiana, Jefferson, Westmoreland, and Clearfield Counties. This activity reflects the gradual eastward movement of the eastern edge of the known productive belt, a trend that was predicted in 1969 by Kelley and others (1970) and that is certain to continue.

The main producing zone for shallow gas in Pennsylvania is an approximately 1,000-foot section of the Upper Devonian covering the lower portion of the Venango Group and most of the Bradford Group. The drillers' sand names change or are misapplied in various areas. However, in the area of most intense activity, the following sand names are used with some degree of regularity and correspondence: Fifth and Bayard in the Lower Venango; and Warren, Speechley, Balltown, Sheffield, Bradford, and Kane in the Bradford Group. Other notable units that received some attention in the 70's include the Lower Mississippian Big Injun and Murrysville sands, and the Upper Venango Group Hundred Foot, Gantz, and Fifty Foot sands. Unconventional gas sources, such as coal gas and shale gas, are discussed below.

The number of shallow gas wells drilled each year has continued to increase throughout the 70's. Figure 31 shows that there was an almost 200 percent increase in the average number of wells drilled per year during the decade as compared with that of the 60's. More astonishing is the 285 percent increase in shallow gas wells per year from 1970 to 1979. The average initial open flow potential for discovery wells during this period was 902 Mcfgpd; the high was 18,600 Mcfgpd from the Peoples Natural Gas #1

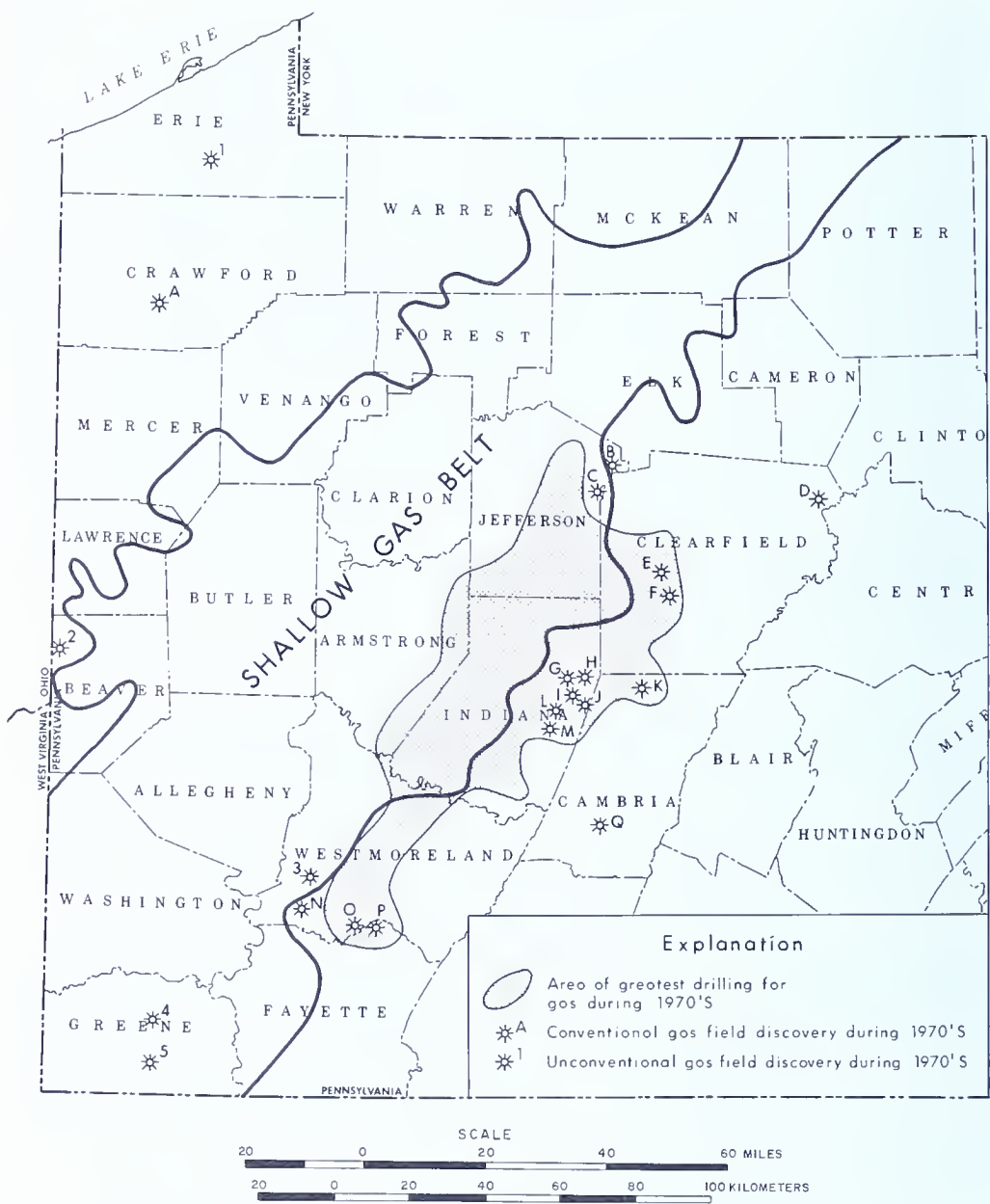


Figure 34. Shallow gas activity in Pennsylvania, 1970-79

- | | |
|------------------------------|---------------------------------|
| A. Vernon — 398 Mcf | M. Kenwood — 103 Mcf |
| B. McEwen Run — 179 Mcf | N. Turkeytown — 200 Mcf |
| C. Falls Creek — 198 Mcf | O. Mayfield — 396 Mcf |
| D. Karthaus — 84 Mcf | P. Hogs — 60 Mcf |
| E. Grampian — 8,009 Mcf | Q. South Fork — 959 Mcf |
| F. Lumber City — 605 Mcf | |
| G. Purchase Line — 1,061 Mcf | 1. Drumlin — 20 Mcf (shale) |
| H. Cush Cushion — 411 Mcf | 2. Darlington — 127 Mcf (shale) |
| I. Commodore — 153 Mcf | 3. Waltz Mill pool — (coal) |
| J. Living Waters — 91 Mcf | 4. Blairtown pool — (coal) |
| K. Plattsville — 650 Mcf | 5. Unnamed pool — (coal) |
| L. Cookport — 531 Mcf | |

Hallie Taylor well in Washington County. This well, which discovered the Granville pool in the Zollarsville field in 1976, produced from the Upper Venango Group (Gantz sand) at 2,300 feet. Since that time, eight additional successful wells have been drilled in the pool with initial unstimulated open flows ranging from 227 to 2,500 Mcfgpd.

The future of shallow unconventional gas reservoirs is uncertain at this time. The Devonian shales, particularly the Dunkirk, Rhinestreet, Middlesex, and Geneseo-Burket black shales, have produced gas in Pennsylvania but not in commercially economic quantities (Piotrowski and Harper, 1979). Shale wells tend to have open flows that decline rapidly, but they can be unusually long lived. Harper (1980) was optimistic about the prospect of noncommercial (domestic) gas from shallow Devonian shale wells in Erie County along the lake shore. The cost of drilling such a well a few hundred feet deep and piping the gas into a house would be within the means of many home owners in that area, and the gas produced would provide long-term savings in energy costs. The deeper shales did not look so promising during the 70's, but continued activity in the 80's may prove this pessimistic view unfounded.

Coal gas, or methane as it is generally called, received a great deal of attention in the late 70's, but it was mostly in connection with mine safety and legal disputes. In Pennsylvania three pools were discovered in coals in the southwestern counties. The Blairtown pool in the Waynesburg field and an unnamed pool in the Gump field, both in Greene County, produced small amounts of gas from the Pittsburgh coal seam. The Waltz Mill pool in the Oakford field, Westmoreland County, produced from a single well drilled into several coal seams in the Allegheny and Pottsville Groups. Methane gas wells, like the Devonian shale wells along the Lake Erie shoreline, may eventually become as standard as conventional wells in coal areas, as soon as the legal problems of coal-versus-gas rights are ironed out. Producing the gas out of coal has safety as well as economic considerations.

Deep Gas

The average number of deep wells drilled per year during the 70's decreased in comparison with the 50's and 60's; however, during the years 1978 and 1979, the number of deep wells greatly increased. There was a 214 percent increase in the number of these wells in 1978 over 1977. The number of wells per deep producing horizon also changed. In the first half of the decade, most deep wells were drilled to the Huntersville-Oriskany zone in the eastern portion of the Allegheny Plateau. In the second half, and especially during the last two years of the decade, the emphasis on deep drilling switched to the Lower Silurian Medina sands in northwestern Pennsylvania. Deep well gas production during the 70's has remained relatively constant at an average 12.5 billion cubic feet per year. However, deep gas as a percentage of total gas production decreased from 20 percent in 1970 to 13 percent

in 1979. This figure should change in the 80's to reflect the increase in deep drilling and the opening up of previously shut-in fields.

Huntersville Chert and Oriskany Sandstone. Approximately 105 billion cubic feet of gas was produced from the Huntersville-Oriskany zone in Pennsylvania in the 1970's. This amount accounts for 84 percent of deep gas production during the decade, but for only 12 percent of total gas production. Compare this figure with the 30 percent of total production in the 60's and the 50 percent figure of the 50's.

Figure 35 indicates the new Huntersville-Oriskany pools and fields discovered during the 1970's. The largest discoveries in terms of initial open flows from the discovery wells were the McKean pool, Erie field, Erie County, at 15,000 Mcfgpd and the East Emporium field, Cameron County, at 13,725 Mcfgpd. The McKean pool is a western extension of the Oriskany production to the east in the Meade pool (now the Summit storage pool). The East Emporium field is an updip-pinchoff type of trap, situated at the edge of the "Oriskany no-sand area" (Figure 35).

Discovery of the Oriskany reservoirs as far off the beaten track as the West Decatur field in eastern Clearfield County and the Salladasburg field in southwestern Lycoming County promised a continuing future for Oriskany production in Pennsylvania. These fields are north and/or east of the previously discovered Oriskany field areas. The West Decatur field lies on the south flank of a northern extension of the Laurel Hill anticline. At least three other wells in the area, drilled in the 1960's, reported little more than shows in the Oriskany. These three unsuccessful wells were drilled north of the anticlinal crest and may have been off the structure entirely. The Salladasburg field was discovered in 1976 on the Tombs Run anticline. It is one of the easternmost Oriskany fields.

In May 1977, the Amoco Production Company and the UGI Development Corporation began a joint program of exploration in Pennsylvania. Most of their drilling was centered in Somerset County, and it is there that they have had the most success. Seven new Huntersville-Oriskany fields were discovered in the area around the town of Somerset at depths ranging from 8,700 to 9,100 feet. New fields and pools were also discovered in Fayette and Westmoreland Counties along known structural trends (Figure 35).

Medina-Tuscarora Sandstone. In the 1970's over 19 billion cubic feet of gas was produced from the Medina Group of northwestern Pennsylvania. This amount is 15 percent of deep gas production and only 2 percent of total production for the decade.

Piotrowski (1981, in press) has shown that the potential for increased production from the Medina exists throughout Erie, Crawford, Mercer, Venango, and Warren Counties. In the 70's Erie and Crawford Counties re-

ceived the greatest attention. Most of the gas is produced from stratigraphic traps in the deltaic sandstone, but there have been reports that fracture porosity in some areas accounts for a percentage of production.

During the 70's, and especially since 1978 when the decontrol of natural gas prices began, most of the deep drilling in the state was concentrated in the Medina, which outstripped drilling in the Huntersville-Oriskany by an order of magnitude. Fifty new fields and pools were discovered in the Medina between 1970 and 1979; 37 of these were discovered after January 1, 1977. The two most promising discoveries of the 1970's, in terms of initial production rates, were the Brimstone pool, Athens field, Crawford County, and the Duncan pool, Barkeyville field, Venango County. The Brimstone pool was discovered in 1979 with an initial after-fracture open flow of 7,898 Mcf/gpd at a depth of 4,955 feet. The Athens field is presently one of the most active fields in Pennsylvania. The Duncan pool, which had an open flow of 5,600 Mcf/gpd, was a deeper pool discovery in 1973. The Barkeyville field had been an abandoned shallow gas field in the Lower Mississippian Murrysburg sand when the Medina was proven productive at 6,593 feet. So far, however, no other Medina wells have been drilled in the field.

The Tuscarora Sandstone, which was shown by Piotrowski (1981, in press) to be a continental facies equivalent of the Medina Group, has also been proven productive in Pennsylvania in the 70's. The Devils Elbow field was discovered in 1977 in Centre County during the Amoco-UGI cooperative exploratory program. The discovery well, #1 Texasgulf, was rumored to have had a natural open flow of 20,000 to 37,000 Mcf/gpd from the highly fractured Tuscarora at 10,760 feet (Piotrowski and others, 1979). However, information on the well was tight until recently. The well was finally reported to have had a natural open flow of 20,000 Mcf/gpd and an after-treatment open flow of 7,000 Mcf/gpd at 10,866 feet. This low figure is misleading. The gas has a high nitrogen content and the 7,000 Mcf/gpd represents net production after the nitrogen is extracted. Amoco is expected to continue its development of the Tuscarora in this area.

PROSPECTIVE TRENDS FOR THE 1980's

Introduction

Despite the great amount of drilling for oil and gas that has occurred in Pennsylvania since 1859, there are still vast areas and significant numbers of potential reservoirs that have not yet been explored. Lytle and others (1971) indicated that only half of the stratigraphic section had been evaluated in only 40 percent of the 26,000 square miles of the Appalachian Plateau in the state. This amounts to only 17 percent of the estimated 90,000 cubic miles of rock in western Pennsylvania. This picture has changed only slightly over

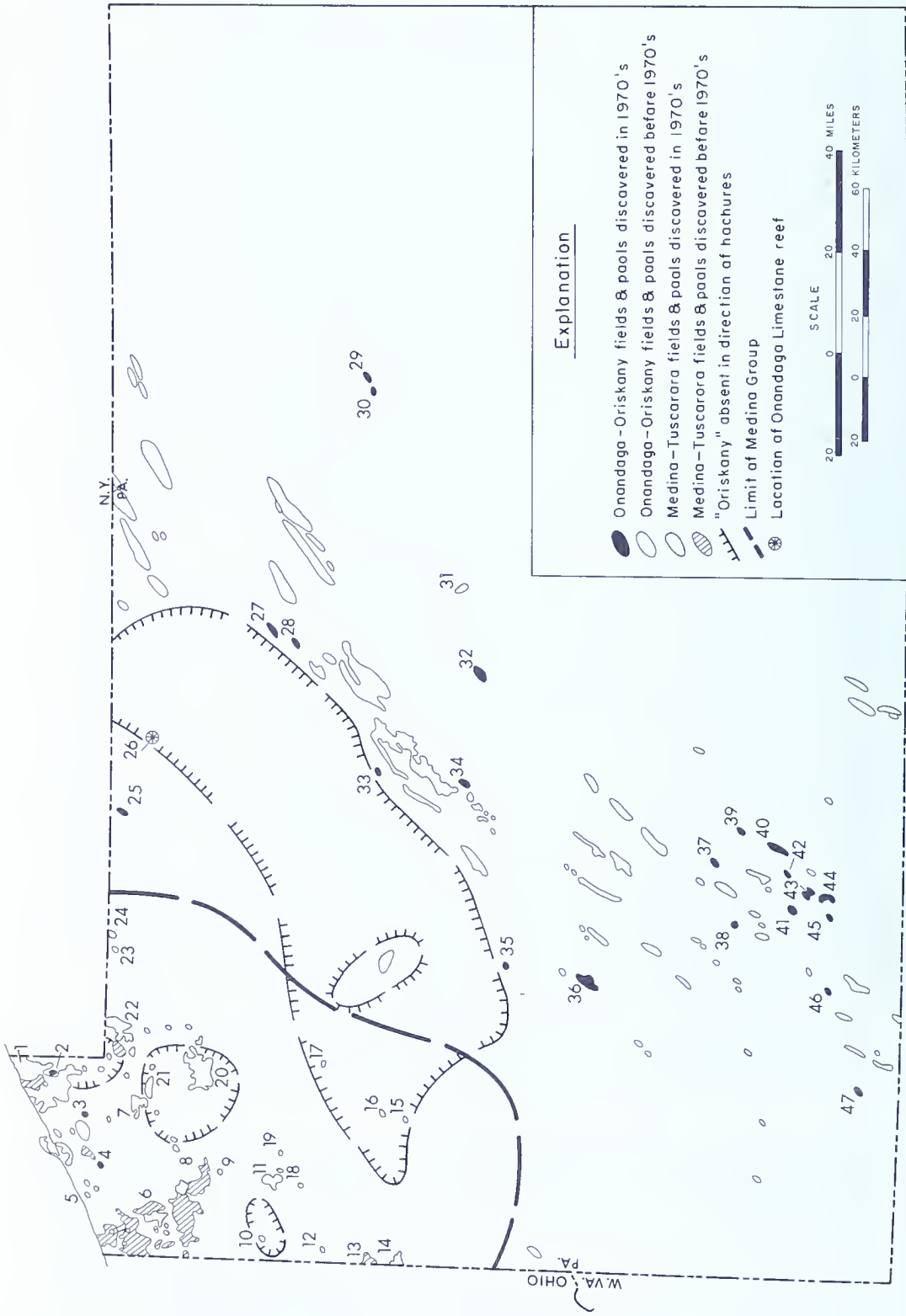


Figure 35. Onondaga-Oriskany and Medina fields in Pennsylvania.

1. North East field
2. Delhill Corners pool
3. Bartosic pool
4. McKean pool
5. Erie field
6. Conneaut field
7. Waterford pool
8. Combridge Springs pool
9. West Mead pool
10. South Shenongo field
11. Greenwood pool
12. Moysville field
13. Sharon Deep pool
14. Wheatlond field
15. Duncan pool
16. Irwin pool
17. Golloway pool
18. Sheokleyville field
19. Kantz Corners field
20. Athens field
21. New Ireland field
22. Brokenstraw field
23. Stillwater field
24. Pettigrew pool
25. Corydon field
26. Cyclone pool
27. East Emporium field
28. Canoe Run field
29. Sallodasburg field
30. Tombs Run pool
31. Devils Elbow field
32. West Decotur field
33. Moshannon pool
34. Anderson Creek pool
35. Snyderville pool
36. Roaring Run Oriskany pool
37. Heckman Hollow field
38. Linn Run field
39. Shade Creek field
40. Shanksville field
41. Bakersville field
42. Somerset East field
43. Somerset West field
44. Shomrock field
45. Rockwood field
46. Mill Run field
47. Woodside pool

the majority of the area in question. Almost none of the Valley and Ridge province has been explored; there have been approximately 3 dozen wells drilled in all of the folded belt of the Appalachians in Pennsylvania.

The discovery of the Eastern Overthrust Belt, and the prospects for oil and gas potential implied by its similarity with the Western Overthrust Belt in the Rocky Mountains, may help to change this picture during the 1980's. (See Harris and Milici, 1977, for a discussion of the Eastern Overthrust Belt and its oil and gas potential.) However, hard data and actual drilling tests are needed to establish the lateral extent as well as the hydrocarbon potential of the Eastern Overthrust Belt; until then it is a concept which in some instances is being overpromoted. Several tests of rocks at great depths have already been conducted in the fold belt and more tests are slated for the near future. Any significant discoveries of either oil or gas could change the scope of drilling operations in that area. In the meantime the prospect of making significant wells in known and suspected reservoirs, both within established fields and in wildcat areas, will be the guide for most of the exploration and development drilling in the 1980's. Comments on the horizons seeming to have the most potential for oil and gas development in the coming years are given below.

Potential Deeper Reservoirs

Onondaga Group

Producing reservoirs in the Onondaga Group are divided here into two major types: (1) reef development in the Edgecliff Member, and (2) chert and cherty limestone facies, either within the Onondaga Group limestones in the north or replacing the limestones in the south.

Patch reefs have been a known constituent of the limestones of the Onondaga Group since James Hall first reported the occurrence of "coral reefs" in 1859. Where these biohermal features occur at the surface, they are generally of limited extent and thickness and are developed in the lower portion of the group, in the Edgecliff Member. Corals and crinoids are abundant (Crowley and Poore, 1974). In 1967 a gas well was drilled into a pinnacle reef in the Edgecliff Member in the subsurface of Steuben County, New York. Subsequent exploration in the county located several other reefs. This led Kelley and others (1970) to speculate on the possible occurrence of similar reefs in Pennsylvania. They pointed out that the New York reefs were developed in areas where the total Onondaga was regionally thin, suggesting a possible platform. After tracing this thinning trend into Pennsylvania, they referred to reefing potential in the northern part of the state. It was not surprising, therefore, when the Amoco Production Company discovered an Onondaga pinnacle reef in the Bradford field of McKean County in 1974 (Figure 35).

Piotrowski (1976) reported that the well, which discovered the Cyclone pool, had an after-treatment open flow of 3,000 Mcfgpd at a depth of 5,184 feet. He indicated that the Edgecliff Member formed a pinnacle 181 feet thick with a gas column of 106 feet. The reef is situated on the northwestern edge of the "Oriskany no-sand area," where the Edgecliff is developed into a broad plain less than 10 feet thick. Piotrowski supported the contentions of Kelley and others (1970) by suggesting that this plain might define a platform developed on a paleo-high (the "no-sand area") which would be ideal for reef development. The potential for reefs in McKean County, and all along the northwestern edge of the "no-sand area," is excellent. At this time it is unknown whether this edge of the "no-sand area" is a pinchout or a fault-bounded change, although the former prospect is the more likely (see Abel and Heyman, 1981).

Subsequent drilling for similar reefs in McKean County has thus far been unsuccessful. One offset well, located about 3 miles southwest of the Amoco discovery, was a dry hole. The limestones in the Onondaga Group in this well were mostly replaced with radioactive shales similar to those in the superjacent Marcellus Formation. There is some speculation as to whether or not the shaling is due to a fault that eliminated the Onondaga and doubled the Marcellus. The mechanical logs on this well do not indicate that faulting took place. It is likely that the radioactive shales and interbedded limestones represent a reef talus or other off-reef facies having high organic content. If this interpretation is correct, there may be other pinnacle reefs closer to the Cyclone pool reef. Further exploration should continue.

There are two basic facies groups in the Onondaga of western Pennsylvania: limestones and cherty limestones are common in the northwest; and chert with subsidiary limestones and shales (the Huntersville Chert) occurs in the remainder of the plateau. They are separated within the zone where the Oriskany Sandstone is absent (Figure 35). (See Jones and Cate (1957) for the approximate boundary between the two facies.) Most of the known gas production from the Onondaga Group in Pennsylvania is from the fractured Huntersville Chert, generally in association with production from subjacent Oriskany Sandstone. However, there is great potential for gas production from the chert even in areas where the Oriskany is absent. For example, the Moshannon pool in Clearfield County is a stratigraphic-type reservoir in the chert at the eastern pinchout of the "Oriskany no-sand area." There should be potential all along this pinchout line for similar reservoirs. Recently discovered Huntersville Chert production of the structural type occurs to the south in Indiana, Westmoreland, and Somerset Counties.

The limestone facies of the Onondaga also has good potential for gas production, even in areas where reef development is unlikely. Even where reefs do not occur, the Onondaga carbonates are commonly biostromal deposits

of chert-rich limestones having shows of oil and gas. An Onondaga limestone discovery in Erie County, the Delhill Corners pool, North East field, is significant. Production from the 1979 discovery well was gauged at 11,400 Mcfgpd at a depth of 2,400 feet from the Clarence Member of the Onondaga limestone facies. The Clarence is a facies equivalent of the Edgecliff (the reef-forming member) containing 30 to 75 percent chert. In a sense, the Delhill Corners pool is situated in a facies transition of the Huntersville Chert. Similar production could be located by active exploratory work. The North East field is primarily a Medina producing field, a fact that may overshadow most non-Medina exploration.

Oriskany Sandstone

Although the Oriskany is a well-known and prolific producer of natural gas in Pennsylvania, it is almost restricted in that capacity to the eastern and southern portions of the Allegheny Plateau. There are only minor areas in the northwest, particularly in Erie County (see Figure 35), where the Oriskany has had a history of gas production, and it has never been considered an important reservoir for oil in Pennsylvania. Oriskany oil has been known in Ohio since 1899 when the Austinburg field was discovered in Ashtabula County (Hall, 1952). However, no oil production from the Oriskany has occurred in Pennsylvania despite the numerous good oil shows reported throughout the 1900's. One particular area where oil shows were common in the Oriskany is in the Conneaut field in western Crawford County. The area just north of Beaver Center, Beaver Township, was explored as early as 1903. The Oriskany, which is about 2,300 feet deep in this area, had reports of oil ranging from "show of oil" to 12 barrels per day. Water in the sandstone, the relatively primitive drilling and completion techniques at the turn of the century, and the small amounts of oil encountered probably discouraged subsequent drilling for this objective. It should be noted that this particular area has had high potential for gas production from the Lower Silurian Medina Sandstone, and that this potential has probably contributed to the lack of development of the Oriskany in the area. However, the prospects for completion of a productive oil well in the Oriskany should be no less than for completion of stripper oil wells in the Upper Devonian.

Helderberg Group and Bass Island Dolomite

The Lower Devonian Helderberg Group and the Upper Silurian Bass Island Dolomite are not normally considered to have gas production potential. However, two wells drilled in the 1970's had production from these units. The Benzinger field in Elk County, discovered in 1972, produced from the Helderberg Group. Production measured 396 Mcfgpd from 6,414 feet. The single well drilled in the field was shut-in during the 1970's and

was finally abandoned in 1978. The Boot Jack pool, Horton field, Elk County, discovered in 1973, produced from the Bass Island Dolomite. The discovery well of this deeper pool in an Upper Devonian field had an open flow of 531 Mcfgpd from 6,492 feet, and produced a total of 11,275 Mcf before being shut-in in 1978. Additional exploratory drilling in Elk County could improve on these figures.

Lockport Dolomite

The Middle Silurian Lockport Dolomite occurs below the Salina Group and has been a known producing reservoir in Pennsylvania since the mid-1960's. The Kilgore pool, Wolf Creek field, Mercer County, was discovered in 1966, and subsequent drilling has expanded the limits of known production. The nine productive wells drilled in the pool during the 1970's had open flows of up to 990 Mcfgpd at depths ranging from 5,258 feet to 5,559 feet. The prospects for continued production and expansion of the pool limits appear to be good. The pool is situated on the southwest flank of the anomalous Henderson dome.

Deeper Potential Reservoirs

The Middle Ordovician Trenton Limestone has been a known producer in both New York and Ohio since the early 1900's. However, there has never been a productive well in the Trenton in Pennsylvania, despite the number of significant shows reported in the carbonates. Most of these shows are in wells drilled in the northwest, particularly in Erie and Crawford Counties, and it seems likely that that area would have the most potential for oil and gas exploration in the Trenton.

The Cambro-Ordovician in Pennsylvania has not been so actively explored as in adjacent states, particularly in Ohio, where the Knox Dolomite has been an active producer since 1919 (Janssens, 1973). The Pennsylvania equivalent of the Knox, the Beekmantown Group, is the most likely target for ultra-deep exploration in the Valley and Ridge province portion of the Eastern Overthrust Belt. Only the Amoco #1 Wilhour Gas Unit well in Northumberland County and the Texas Eastern #1 Taylor well in Bedford County have penetrated this unit in the past ten years, however, and both were dry holes. The Amoco well was a 14,737-foot test drilled in 1980. The Texas Eastern well, drilled in 1972, had a total depth of 11,597 feet.

In Pennsylvania only three wells have produced from the Cambrian, and only one of these was drilled during the 1970's. The Minard Run pool, Bradford field, McKean County, was discovered in 1975. The well had an open flow of 500 Mcfgpd at 10,230 feet. It has subsequently produced 12,000 Mcf. The name Little Falls Formation was used for the particular producing horizon. The depth of the Minard Run pool discovery well is

going to be a significant factor in determining future drilling in the area. In the northwestern counties, particularly in western Erie and Crawford Counties, the Cambrian Gatesburg Formation is only about 6,000 to 7,000 feet deep, making exploration of the potential reservoir less prohibitive than in McKean County. The Scull pool and the Beaver Center pool, two Gatesburg reservoirs discovered in the Conneaut field, Crawford County, in the 1960's, also indicate that production is possible from the Gatesburg. The combination of depth and known productive potential makes the Gatesburg a likely target for future exploration in Erie and Crawford Counties.

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Figure 36. Summarized records of reported deep wells in 1980 that penetrated rocks of Middle Devonian or older age

COUNTY	Permit Number	Centre	Centre	Centre	Centre	Clarion	Clearfield	Crawford	Crawford	Crawford
		20006	20008	20012	20014	20819	20970	20524	20525	20528
NAME OF WELL	Texasgulf, Inc. #1	Reuben Griffith #1	Reuben Griffith #1	Reuben Griffith #1-A	Reuben Griffith #1-A	A. P. Weaver & Sons #1	Boyd G. Peters Unit #1	Rebert Developers Inc. #33	Frank & Helen Bitenc. #1	A. C. Surrauer #2
OPERATOR	Amoco/UGI	Phillips Pet. Company	Amoco Production Company	Amoco Production Company	Amoco Production Company	Consolidated Gas Supply Corp. WH-1768	Texaco, Inc.	N-Ren Corp.	N-Ren Corp.	Meridian Oil & Gas Enterprises
TOWNSHIP	Boggs	Boggs	Boggs	Boggs	Boggs	Highland	Bradford	Greenwood	Greenwood	Summerhill
QUADRANGLE & MAP NUMBER	Snow Shoe H 8 ***Snow Shoe SE G	Snow Shoe H 7 **Snow Shoe G	Bellefonte B 4 **Bellefonte A	Bellefonte B 5 **Bellefonte A	Bellefonte B 5 **Bellefonte A	Clarion B 9 **Strattonville A	Clearfield I 46 **Leontes Mls H	Meadville G 43 **Geneva G	Meadville G 44 **Geneva H	Strard I 515 **Conneautville H
LATITUDE	9,800 ft. S 41°02'30"	5,750 ft. S 41°02'30"	11,200 ft. S 41°00'00"	11,150 ft. S 41°00'00"	3,750 ft. S 41°15'00"	3,750 ft. S 41°15'00"	13,150 ft. S 41°02'30"	6,600 ft. S 41°32'30"	10,450 ft. S 41°32'30"	15,000 ft. S 41°47'30"
LONGITUDE	2,500 ft. W 77°50'00"	7,000 ft. W 77°50'00"	3,350 ft. W 77°50'00"	3,335 ft. W 77°50'00"	4,400 ft. W 79°20'00"	2,900 ft. W 80°12'30"	9,259 ft. W 78°17'30"	2,900 ft. W 80°12'30"	6,100 ft. W 80°10'00"	3,850 ft. W 80°17'30"
DATE COMPLETED	12-18-77	10-18-78	11-7-79	2-28-80	2-22-80	8-12-80	6-20-77	6-27-77	6-27-77	9-9-78
ELEVATION	2100 GR	2068 KB	921 KB	921 KB	1501 KB	1660 KB	1325 GR	1345 GR	1284 KB	1372 KB
TALLY					*5333-	*6900-	*3202-	*3276-		*3406-
ONONDAGA					5664-	7834-	3364-	3439-		3594-
CHERT					5672-	7880-	3536-	3618-		3767-
ORISKANY					5722- Gas @ 5723-5728	7908-				*3579-
HELDERBERG					5729-					
KEYSER-BASS ISLAND										
S'CLINA										
GUELPH-LOCKPORT										
BLACK WATER										
CLINTON										
IRONDEQUOIT										
MEDINA	Tuscarora @ 10,676-	Tuscarora @ 10,756-						4730-	4858-	3848-
WHIRLPOOL								4784-	3946-	3919-
QUEENSTON								Gas @ 4828-4890 4956-	Gas @ 3997-4062 4132	4994-
TOTAL DEPTH	11,187	11,170	6894	8611	5843	7955	5054	5056-	4140	5144-
DEEPEST FORMATION REACHED	Tuscarora	Tuscarora	McKenzie	Tuscarora	Helderberg	Helderberg	Queenston	Queenston	Queenston	Queenston
RESULT	20,000 Mcf Est. 7,000 Mcf AF 6,699 psi/108 days Gas @ 10,759-10,974 new field discov.	1,500 Mcf Nat 1,500 Mcf/Avg. AF 5,600 psi/Avg. Tuscarora produc. development Devils Elbow field	Junked and abandoned new field wildcat	2,050 Mcf AF 4,173 psi/145 hrs new field discovery Runville field	60 Mcf AF 440 psi/106 hrs. new pool discovery Weaver pool Clarion-Moia field	1,500 Mcf Nat. new field wildcat after frac well made salt water plugged and abandoned	1,273 Mcf AF 1,250 psi/72 hrs. development Greenwood pool Geneva field	1,000 Mcf AF 1,100 psi/48 hrs. discovery new pool Rock Creek pool Geneva field	5 bopd & 1,000 Mcf AF 1,070 psi/72 hrs. development Indian Springs pool Conneaut field	10 Mcf Nat. 1,000 Mcf AF 420 psi/48 hrs. new field discovery Kantz Corners field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Crawford 20546	Crawford 20547	Crawford 20548	Crawford 20549	Crawford 20550	Crawford 20556	Crawford 20551	Crawford 20564	Crawford 20572	Crawford 20573	Crawford 20578
NAME OF WELL	Jane Bean, et al. #1	Rodger L. Brown, et ux. #1	Leonard P. Koby, et ux. #1	Lyle W. Schaeff, et ux. #2	Henry G. Schwan, et al. #1	Leslie Sheffield, et ux. #1	Hick Winton #4	Raymond A. Buchanan #1	John Bowman & Joseph Coblenz #1	Wainoco Oil & Gas Company #3	Wainoco Oil & Gas Company #1	Wainoco Oil & Gas Company #3
OPERATOR	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises	Wainoco Oil & Gas Company #4	Wainoco Oil & Gas Company #10	Wainoco Oil & Gas Company #3	Wainoco Oil & Gas Company #3
TOWNSHIP	Beaver	Conneaut	Beaver	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Rome	Athens	Athens	Athens
QUADRANGLE & MAP NUMBER	Girard G 516 **Beaver Center H	Girard G 517 **Beaver Center H	Girard G 518 **Beaver Center H	Linesville A 70 **Linesville B	Linesville A 71 **Linesville B	Linesville A 72 **Linesville B	Union City I 47 **Lake Canadashka I	Union City H 48 **Hilliers Strain	Union City H 59 **Lake Canadashka I	Union City H 48 **Hilliers Strain	Union City H 59 **Lake Canadashka I	Union City H 59 **Lake Canadashka I
LATITUDE	10,960 ft. S 41°47'30"	13,980 ft. S 41°47'30"	10,900 ft. S 41°47'30"	200 ft. S 41°45'00"	1,740 ft. S 41°45'00"	2,280 ft. S 41°45'00"	14,600 ft. S 41°47'30"	11,350 ft. S 41°47'30"	9,700 ft. S 41°47'30"	9,700 ft. S 41°47'30"	9,700 ft. S 41°47'30"	500 ft. S 41°45'00"
LONGITUDE	7,280 ft. W 80°25'00"	6,760 ft. W 80°25'00"	9,620 ft. W 80°25'00"	7,400 ft. W 80°25'00"	6,840 ft. W 80°25'00"	5,420 ft. W 80°25'00"	2,050 ft. W 79°45'00"	1,550 ft. W 79°52'30"	1,500 ft. W 79°50'00"	1,500 ft. W 79°50'00"	1,500 ft. W 79°47'30"	1,850 ft. W 79°47'30"
DATE COMPLETED	8-9-78	8-1-78	8-6-78	8-18-78	8-16-78	8-20-78	4-12-79	4-5-79	4-13-79	4-13-79	4-13-79	5-20-79
ELEVATION	1167 KB	1172 KB	1140 KB	1182 KB	1184 KB	1183 KB	1346 KB	1496 KB	1591 KB	1591 KB	1591 KB	1636 KB
TULLY												
ONONDAGA												
CHERT												
ORISKANY	Absent	Absent	Absent	Absent	2718	Absent	Absent	Absent	Absent	Absent	Absent	Absent
HELDERBERG	2617-	2637-	2577-	2649-	2741-	2664-	2664-	2664-	3490-	3490-	3634-	3786-
KEYSER-BASS ISLAND	2650-	2673-	2614-	2682-	2780-	2700-	2700-	2700-	3523-	3523-	3669-	3811-
SALINA	2694-	2719-	2655-	2728-	2838-	2743-	2743-	2743-	3548-	3548-	3700-	3834-
GUELPH-LOCKPORT	3264-	3354-	3278-	3281-	3306-	3315-	3315-	3315-	4177-	4177-	4320-	4382-
BLACK WATER												
CLINTON	3553-	3645-	3544-	3624-	3624-	3650-	3650-	3650-	4453-	4453-	4600-	4738-
IRONDEQUOIT	3652-	3692-	3612-	3693-	3720-	3721-	3721-	3721-	4552-	4512-	4643-	4778-
MEDINA	3680-	3721-	3640-	3721-	3745-	3750-	3750-	3750-	4578-	4540-	4668-	4805-
WHIRLPOOL	3848-	3904-	3826-	3892-	3933-	3933-	3933-	3933-	4760-	4725-	4852-	4988-
QUEENSTON	3865-	3908-	3830-	3911-	3938-	3938-	3938-	3938-	4776-	4738-	4864-	5006-
TOTAL DEPTH	3928	3958	3896	3988	3988	4013	4873	4685	5020	5165	5165	5165
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	1,050 Mcf AF 1,075 psi/72 hrs. development Indian Springs pool Conneaut field	960 Mcf AF 1,050 psi/72 hrs. development Indian Springs pool Conneaut field	5 bopd & 1,200 Mcf AF 1,078 psi/72 hrs. development Indian Springs pool Conneaut field	750 Mcf AF 1,085 psi/72 hrs. development Indian Springs pool Conneaut field	820 Mcf AF 1,072 psi/72 hrs. development Indian Springs pool Conneaut field	5 bopd & 1,100 Mcf AF 1,085 psi/72 hrs. development Indian Springs pool Conneaut field	398 Mcf AF 1,400 psi/72 hrs. development Brimstone pool Athens field	173 Mcf AF 1,280 psi/72 hrs. extension Potash Run pool Athens field	211 Mcf AF 1,340 psi/72 hrs. extension Brimstone pool Athens field	211 Mcf AF 1,340 psi/72 hrs. extension Brimstone pool Athens field	3,780 Mcf AF 1,360 psi/72 hrs. development Brimstone pool Athens field	3,780 Mcf AF 1,360 psi/72 hrs. development Brimstone pool Athens field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20579	Crawford 20581	Crawford 20582	Crawford 20583	Crawford 20589	Crawford 20591	Crawford 20592	Crawford 20593	Crawford 20594	Crawford 20595
NAME OF WELL		San Byler #1	Franklyn & Helene Boyd #1	Hubert Vanderhoff #1	George & Arlene Bangs #1	Merton & Charlotte Donor #1	Ben J. Miller #1	Walter Foltz #1	Norris B. Head Est. #1	Daniel & Sandra Foltz #1	Edward & Marjorie Mills #1
OPERATOR		Mainoco Oil & Gas Company W-23	Mainoco Oil & Gas Company W-15	Mainoco Oil & Gas Company W-25	Mainoco Oil & Gas Company W-26	Mainoco Oil & Gas Company W-31	Mainoco Oil & Gas Company W-24	Mainoco Oil & Gas Company W-32	P.O.I. Energy, Inc.	Mainoco Oil & Gas Company W-22	Mainoco Oil & Gas Company W-19
TOWNSHIP		Rome	Athens	Rome	Rome	Athens	Rome	Athens	South Shenango	Rome	Athens
MAP											
ADJACENT & NUMBER		Corry G 46	Townville C 12	Titusville A 6	Corry G 50	Townville C 13	Titusville A 7	Townville C 14	Linesville G 69	Union City I 49	Union City I 50
		**Spartansburg G	**Centerville B	**Titusville N B	**Spartansburg G	**Centerville B	**Titusville N A	**Centerville B	**Hartsston E	**Lake Canadohta	**Lake Canadohta
LATITUDE		10,400 ft. S 41°47'30"	4,900 ft. S 41°45'00"	900 ft. S 41°45'00"	13,200 ft. S 41°47'30"	4,650 ft. S 41°45'00"	1,850 ft. S 41°45'00"	1,350 ft. S 41°45'00"	4,800 ft. S 41°45'00"	10,750 ft. S 41°47'30"	7,550 ft. S 41°47'30"
LONGITUDE		8,400 ft. W 79°42'30"	3,200 ft. W 79°47'30"	7,050 ft. W 79°40'00"	1,750 ft. W 79°42'30"	8,800 ft. W 79°47'30"	2,850 ft. W 79°42'30"	6,000 ft. W 79°47'30"	5,300 ft. W 80°25'00"	3,650 ft. W 79°45'00"	5,650 ft. W 79°47'30"
DATE COMPLETED		5-13-79	7-19-79	6-5-79	6-19-79	7-11-79	7-27-79	8-3-79	8-9-79	8-24-79	8-10-79
ELEVATION		1401 KB	1611 KB	1655 GR	1451 KB	1521 KB	1376 KB	1531 KB	1226 KB	1461 KB	1521 KB
TALLY		*3135-	*3372-	*3562-	*3332-	*3274-	*3202-	*3210-	*2679-	*3160-	*3202-
ONONDAGA	LIMESTONE	3378-	3602-	3805-	3576-	3506-	3444-	3440-	2825-	3398-	3434-
	CHERT										
ORISKANY		Absent	Absent	Absent	Absent	Absent	Absent	3576-	3030-	Absent	3608-
Helderberg		3544-	3764-	3959-	3745-	3670-	3609-	3609-	3044-	3572-	3626-
Keyser-Bass Island		3556-	3810-	3981-	3766-	3715-	3852-	3633-	3077-	3614-	3644-
Salina		3584-	3834-	4025-	3812-	3740-	3676-	3679-	3188-	3644-	3674-
Guelph-Lockport		4172-	4440-	4574-	4348-	4369-	4310-	4233-	3830-	4274-	4288-
Black Water											
Clinton		4518-	4751-	4934-	4696-	4640-	4587-	4571-	4122-	4538-	4556-
Irondequoit		4578-	4805-	4995-	4758-	4701-	4647-	4630-	4174-	4590-	4616-
Medina		4601-	4830-	5020-	4782-	4726-	4672-	4659-	4208-	4620-	4642-
Whirlpool		Gas @ 4657-4796 4782-	Gas @ 4893-5026 5010-	Gas @ 5083-5214 5204-	Gas @ 4946-4977 4964-	Gas @ 4764-4852 4909- Gas	Gas @ 4711-4801 4855- Gas	Gas @ 4714-4792 4840- Gas	Gas @ 4671-4813 4402-	Gas @ 4671-4813 4738-	Gas @ 4693-4769 4822-
Queenston		4816-	5030-	5224-	4980-	4927-	4876-	4856-	4412-	4815-	4836-
Total Depth		4950	5188	5389	5141	5064	5030	5018	7155	4985	5006
Deepest Formation Reached		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Gatesburg	Queenston	Queenston
Result		5,145 Mcf AF 1,360 psi/30 days Br-tracton pool Athens field	651 Mcf AF 1,320 psi/72 hrs Athens field	3,364 Mcf AF RP not taken new pool Br-tracton pool Athens field	905 Mcf AF RP not taken Athens field	1,271 Mcf AF 1,310 psi/72 hrs Athens field	1,271 Mcf AF 1,310 psi/72 hrs Athens field	1,165 Mcf AF 1,350 psi/72 hrs Athens field	1,095 Mcf AF 1,250 psi/72 hrs Athens field	1,500 Mcf AF 1,300 psi/72 hrs Br-tracton pool Athens field	137 Mcf AF 1,300 psi/72 hrs Br-tracton pool Athens field

COUNTY	Permit Number	Crawford 20596	Crawford 20597	Crawford 20600	Crawford 20601	Crawford 20602	Crawford 20603	Crawford 20604	Crawford 20605	Crawford 20606	Crawford 20607
N. NAME OF WELL		Michael & Gloria Kelly #1	Jack & Kathryn Preston #2	Walter Process #1	Joseph & Helen Kleinert #2	Peter & Antoinette Stagl #1	Harold Eschweiler #1	Henry Rippert #2	Austin F. Conley #1	Jessie M. Oaks #1	David E. Bish #1
OPERATOR		Wainoco Oil & Gas Company H-37	Wainoco Oil & Gas Company H-20	Wainoco Oil & Gas Company H-16	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Meridian Oil & Gas Enterprises	Meridian Oil & Gas Enterprises
TOWNSHIP		Athens	Rome	Athens	Spring	Spring	Spring	Spring	Spring	Beaver	Beaver
QUADRANGLE & MAP NUMBER		Union City H 64 **Lake Canadonha I	Union City I 51 **Lake Canadonha I	Union City I 52 **Lake Canadonha I	Girard E 481 **Conneautville A	Girard E 482 **Conneautville A	Girard H 483 **Conneautville D	Girard E 484 **Conneautville A	Girard E 485 **Conneautville A	Girard G 486 **Beaver Center H	Girard G 487 **Beaver Center H
LATITUDE		14,200 ft. S 41°47'30"	8,500 ft. S 41°47'30"	14,700 ft. S 41°47'30"	12,600 ft. S 41°52'30"	14,000 ft. S 41°52'30"	350 ft. S 41°50'00"	14,000 ft. S 41°52'30"	13,950 ft. S 41°52'30"	9,200 ft. S 41°47'30"	8,800 ft. S 41°47'30"
LONGITUDE		9,200 ft. W 79°50'00"	4,250 ft. W 79°45'00"	5,600 ft. W 79°45'00"	5,050 ft. W 80°20'00"	11,250 ft. W 80°20'00"	5,750 ft. W 80°20'00"	9,350 ft. W 80°20'00"	7,900 ft. W 80°20'00"	9,600 ft. W 80°25'00"	7,140 ft. W 80°25'00"
DATE COMPLETED		8-17-79	9-1-79	9-11-79	9-20-79	10-2-79	10-6-79	10-19-79	10-4-79	10-19-79	10-10-79
ELEVATION		1480 GR	1401 KB	1551 KB	1144 OF	1144 DF	1144 OF	1124 OF	1134 OF	1148 KB	1151 KB
TULLY		*3196-	*3102-	*3308-	2127-	2140-	2134-	2090-	2285-	*2197-	*2210-
ONONDAGA LIMESTONE CHERT		3426-	3340-	3546-	2310-	2310-	2314-	2268-	2350-	2350-	2370-
ORISKANY		3606-	Absent	3709-						2568-	Absent
HELDERBERG		3615-	3514-	3730-						2584-	2589-
KEYSER-BASS ISLAND		3639-	3554-	3747-						2602-	2618-
SALINA		3660-	3588-	3774-						2642-	2660-
GUELPH-LOCKPORT BLACK WATER		4268-	4211-	4390-	3120-	3206-	3212-	3156-	3169-	3351-	3280-
CLINTON		4550-	4495-	4678-	3416-					3538-	3546-
IRONDEQUOIT		4600-	4542-	4724-	3518-	3546-	3547-	3494-	3518-	3589-	3590-
MEDINA		4627-	4569-	4750-	3544-	3572-	3574-	3523-	3535-	3621-	3620-
WHIRLPOOL		4634-	4634-4758	Gas @ 4804-4944	Gas @ 3590-3624	Gas @ 3596-3661	Gas @ 3631-3672	Gas @ 3597-3618	Gas @ 3560-3620	Gas @ 3662-3755	Gas @ 3695-3761
QUEENSTON		4804-	4749-	4930-	3717-3724	3751-	3756-	3706-	3714-	3792-	3814-
		4821-	4764-	4946-			3762-	3706-	3721-	3810	3827-
TOTAL DEPTH		4985	4925	5109	3724	3781	3935	3746	3776	3836	3855
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Whirlpool	Whirlpool	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		154 Mcf AF 1,350 psi/72 hrs Potash Run pool Athens field	710 Mcf AF 1,340 psi/72 hrs development Brimstone pool Athens field	198 Mcf AF 1,320 psi/72 hrs development Brimstone pool Athens field	1,750 Mcf AF 1,050 psi/28 days development Lundys Lane pool Conneaut field	1,000 Mcf AF 1,030 psi/28 days extension Lundys Lane pool Conneaut field	1,700 Mcf AF 1,050 psi/28 days development Lundys Lane pool Conneaut field	950 Mcf AF 1,073 psi/ ? development Lundys Lane pool Conneaut field	1,100 Mcf AF 1,050 psi/28 days development Lundys Lane pool Conneaut field	2,000 Mcf AF 1,068 psi/72 hrs development Indian Springs pool Conneaut field	1,000 Mcf AF 1,023 psi/72 hrs development Indian Springs pool Conneaut field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20608	Crawford 20610	Crawford 20611	Crawford 20612	Crawford 20613	Crawford 20614	Crawford 20616	Crawford 20617	Crawford 20618	Crawford 20625
NAME OF WELL		David E. Bish #2	William O. Bradley #1	Theodore S. Bogardus #3	Theodore S. Bogardus #2	Theodore S. Bogardus #4	Theodore S. Bogardus #5	O. Hammermeister #1	William Irwin #1	F. Miller #1	Wilbur F. Wheeler #1
OPERATOR		Meridian Oil & Gas Enterprises	Hainoco Oil & Gas Company H-17	Hainoco Oil & Gas Company H-18	Hainoco Oil & Gas Company H-13	Hainoco Oil & Gas Company H-21	Hainoco Oil & Gas Company H-22	Cardinal Oil Company	Cardinal Oil Company	Cardinal Oil Company	Cardinal Oil Company
TOWNSHIP		Beaver	Bloomfield	Athens	Athens	Athens	Athens	Beaver	Beaver	Beaver	Spring
QUADRANGLE & MAP NUMBER		Girard G 488 **Beaver Center	Union City I 53 **Lake Canadotia	Union City I 54 **Lake Canadotia	Union City I 55 **Lake Canadotia	Union City I 56 **Lake Canadotia	Union City I 57 **Lake Canadotia	Girard H 499 **Beaver Center	Girard G 500 **Beaver Center	Girard G 501 **Beaver Center	Girard I 502 **Conneautville
LATITUDE		6,780 ft. S 41°47'30"	5,700 ft. S 41°47'30"	9,100 ft. S 41°47'30"	11,500 ft. S 41°47'30"	14,750 ft. S 41°47'30"	12,050 ft. S 41°47'30"	5,560 ft. S 41°50'00"	4,480 ft. S 41°50'00"	6,540 ft. S 41°50'00"	6,800 ft. S 41°50'00"
LONGITUDE		6,960 ft. W 80°25'00"	2,300 ft. W 79°47'30"	2,000 ft. W 79°47'30"	1,650 ft. W 79°47'30"	9,550 ft. W 79°45'00"	10,550 ft. W 79°45'00"	11,180 ft. W 80°22'30"	3,700 ft. W 80°25'00"	1,160 ft. W 80°25'00"	1,940 ft. W 80°17'30"
DATE COMPLETED		9-30-79	9-18-79	10-17-79	10-11-79	9-26-79	10-3-79	11-2-79	10-21-79	12-8-79	3-7-80
ELEVATION		1118 KB	1366 KB	1421 KB	1481 KB	1311 KB	1311 KB	1000 GR	1011 GR	1006 GR	1161 GR
TULLY			*3002-	3030-	*3244-	3058-	3036-	1978-	1994-	1994-	2242-
ONONDAGA	LIMESTONE		3234-	3324-	3478-	3289-	3272-	2147-	2162-	2062-	2426-
	CHERT										
ORISKANY			Absent		3648-			2392-	2402-	2401-	2622-
HELDERSBERG			3402-		3660-			2430-	2454-	2450-	2661-
KEYSER-BASS ISLAND			3440-		3688-			2630-	2651-	2654-	2862-
SALINA			3468-		3713-			3051-	3061-	3072-	3295-
GUELPH-LOCKPORT			4090-		4242-						
BLACK WATER											
CLINTON			4349-		4591-			3308-	3315-	3330-	3570-
IRONDEQUOIT			4420-		4652-			3420-	3423-	3442-	3674-
MEDINA			4445-		4705-			Gas @ 3472-3510	Gas @ 3478-3600	Gas @ 3460-3618	3674-
WHIRLPOOL		Gas @ 3649-3782 *3789-	Gas @ 4505-4638 4628-	Gas @ 4591-4731 4716-	Gas @ 4629-4872 4859-	Gas @ 4668-4691 4681-	Gas @ 4602-4668 4658-				
QUEENSTON			4641-		4875-			3604-	3606-	3621-	3854-
TOTAL DEPTH			4822	4849	5012	4854	4852	3661	3636	3699	3892
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		700 Mcf AF 1,050 psi/72 hrs development Indian Springs pool Conneaut field	1,218 Mcf AF RP not taken development Brinestone pool Athens field	3,380 Mcf AF RP not taken development Brinestone pool Athens field	916 Mcf AF RP not taken development Brinestone pool Athens field	389 Mcf AF 1,360 psi/72 hrs development Brinestone pool Athens field	149 Mcf AF 1,250 psi/72 hrs development Brinestone pool Athens field	17.5 Mcf AF 9 bopd AF 50 psi/3 days development Stone Run pool Conneaut field	21 Mcf AF 6 bopd AF 1,140 psi/3 days development Stone Run pool Conneaut field	21 Mcf AF 6 bopd AF 660 psi/3 days development Stone Run pool Conneaut field	600 Mcf AF 760 psi/3 days development Indian Springs pool Conneaut field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Crawford 20630	Crawford 20631	Crawford 20632	Crawford 20633	Crawford 20634	Crawford 20635	Crawford 20640	Crawford 20641	Crawford 20642	Crawford 20643
NAME OF WELL		Lawrence & Betty Miller #1	Joseph & Helen Kleinert #3	John R. Doctor #1	Gordon & George Peters #1	James H. Zillhaber #1	John Kobys #2	Elizabeth G. King #1	Clyde Payne #1	F. Miller #2	Earl Hamilton #1
OPERATOR		Northwest Natural Gas Company	Northwest Natural Gas Company	Meridian Exploration Corp.	Meridian Exploration Corp.	Meridian Exploration Corp.	Northwest Natural Gas Company	Cardinal Oil Company	Cardinal Oil Company	Cardinal Oil Company	Center Bar Gas Company
TOWNSHIP		Spring	Spring	Rockdale	Rockdale	Rockdale	Spring	Spring	Spring	Beaver	Spring
QUADRANGLE & MAP NUMBER		Girard E 489 **Conneautville A	Girard E 490 **Conneautville A	Union City G 61 **Millers Statn O	Union City G 62 **Millers Statn E	Union City G 63 **Millers Statn D	Girard E 491 **Conneautville A	Girard I 503 **Conneautville E	Girard I 504 **Conneautville F	Girard G 505 **Beaver Center E	Girard H 506 **Beaver Center F
LATITUDE		14,960 ft. S 41°52'30"	14,100 ft. S 41°52'30"	5,850 ft. S 41°50'00"	1,350 ft. S 41°50'00"	8,550 ft. S 41°50'00"	9,450 ft. S 41°52'30"	6,240 ft. S 41°50'00"	6,240 ft. S 41°50'00"	7,900 ft. S 41°50'00"	7,920 ft. S 41°50'00"
LONGITUDE		8,960 ft. W 80°20'00"	3,550 ft. W 80°20'00"	10,250 ft. W 79°57'30"	9,950 ft. W 79°55'00"	2,800 ft. W 79°57'30"	4,550 ft. W 80°20'00"	8,400 ft. W 80°17'30"	7,560 ft. W 80°15'00"	1,120 ft. W 80°25'00"	1,600 ft. W 80°22'30"
DATE COMPLETED		10-19-79	10-17-79	12-16-79	12-9-79	11-30-79	10-22-79	2-22-80	11-24-79	12-21-79	12-21-79
ELEVATION		1150 GR	1140 GR	1160 K8	1440 K8	1210 K8	1124 OF	1177 OF	1283 GR	1012 GR	900 GR
TULLY		2050-	2142-	*2502-	*2790-	*2568-	1999-	2257-	2332-	2026-	
ONONDAGA LESTONE		2237-	2322-	2718-	3012-	2790-	2190-	2434-	2516-	2192-	2120-
CHERT											
ORISKANY				2901-	3202-	Absent		2638-	2714-	2420- Show of oil	2344-
HELDERBERG				2927-	3211-	2972-		2675-	2755-	2490-	2384-
KEYSER-BASS ISLAND				2941-	3228-	2998-		2686-	2973-	2674-	2588-
SALINA				2970-	3260-	3014-		3301-	3398-	3092-	3010-
GUELPH-LOCKPORT		3124-	3203-	3564-	3832-	3650-	3158-				
BLACK WATER											
CLINTON				3852-	4120-	3918-		3542-	3662-	3344-	3269-
IRONDEQUOIT		3460-	3538-	3907-	4175-	3974-	3474-				
MEDINA		3483-	3565-	3932-	4202-	3999-	3499-	3672-	3769-	3459-	3382-
WHIRLPOOL		Gas @ 3548-3590 3669-	Gas @ 3593-3755 3745-	Gas @ 3974-4120 4110-	Gas @ 4252-4386 4376-	Gas @ 4056-4186 4177-	Gas @ 3576-3590 3672-	Gas @ 3700-3849	Gas @ 3808-3854	Gas @ 3491-3643	Gas @ 3416-3476
QUEENSTON		3678	3752-	4123-	4391-	4191-	3676-	3852-	3946-	3636-	3568-
TOTAL DEPTH		3722	3836	4299	4489	4290	3718	3877	3988	3713	3568
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		2,150 Mcf AF 1,020 psi/28 days development Lundys Lane pool Conneaut field	1,600 Mcf AF development Lundys Lane pool Conneaut field	32 Mcf Nat. 575 Mcf AF 1,300 psi/12 days extension Rockdale field	44 Mcf Nat. 880 Mcf AF 1,280 psi/8 days extension Rockdale field	75 Mcf Nat. 244 Mcf AF 1,240 psi/7 days discovery Rockdale field	1,700 Mcf AF 1,050 psi/3 days development Lundys Lane pool Conneaut field	500 Mcf AF 720 psi/3 days extension Indian Springs pool Conneaut field	800 Mcf AF 1,110 psi/3 days extension Indian Springs pool Conneaut field	61 Mcf AF 3 bopd AF 1,060 psi/3 days development Stone Run pool Conneaut field	43 Mcf AF 2 bopd AF 290 psi/3 days development Springboro pool Conneaut field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20644	Crawford 20645	Crawford 20646	Crawford 20647	Crawford 20648	Crawford 20649	Crawford 20651	Crawford 20652	Crawford 20653	Crawford 20654
NAME OF WELL		Serbian Orthodox Charity Home #4	Serbian Orthodox Charity Home #5	Serbian Orthodox Charity Home #6	Neal & Dorothy Hasbrouck #2	George & Maxwell Clark #2	Paul, Mary & Joseph Kulik #1	Richard A. Heath #1	Martha & Mary Paul & Mildred Post #1	Theodore S. Bogardus #6	J. Greene #1
OPERATOR		Center Bar Gas Company	Center Bar Gas Company	Center Bar Gas Company	Wainoco Oil & Gas Company H-33	Wainoco Oil & Gas Company H-36	Northwest Natural Gas Company	Wainoco Oil & Gas Company H-35	Wainoco Oil & Gas Company H-28	Wainoco Oil & Gas Company H-38	Center Bar Gas Company
TOWNSHIP		Spring	Spring	Spring	Rome	Athens	Spring	Athens	Rome	Athens	Spring
QUADRANGLE	MAP NUMBER	Girard H 507 **Beaver Center F	Girard H 508 **Beaver Center F	Girard H 509 **Comaechville D	Titusville B 9 **Titusville N C	Townville C 15 **Centerville C	Girard E 492 **Comaechville A	Union City H 59 **Lake Canadota G	Titusville A 8 **Titusville N B	Townville C 16 **Centerville C	Girard H 510 **Beaver Center F
LATITUDE		3,320 ft. S 41°50'00"	4,900 ft. S 41°50'00"	6,440 ft. S 41°50'00"	10,900 ft. S 41°45'00"	4,500 ft. S 41°45'00"	10,250 ft. S 41°52'30"	14,900 ft. S 41°47'30"	7,450 ft. S 41°45'00"	2,200 ft. S 41°45'00"	7,820 ft. S 41°50'00"
LONGITUDE		1,200 ft. W 80°22'30"	860 ft. W 80°22'30"	9,600 ft. W 80°20'00"	2,250 ft. W 79°37'30"	7,600 ft. W 79°45'00"	3,200 ft. W 80°20'00"	450 ft. W 79°50'00"	6,400 ft. W 79°40'00"	8,950 ft. W 79°45'00"	5,420 ft. W 80°22'30"
DATE COMPLETED		11-16-79	11-7-79	11-24-79	12-7-79	10-26-79	10-26-79	11-2-79	11-29-79	11-10-79	12-12-79
ELEVATION		1004 DF	965 DF	1064 DF	1631 KB	1371 KB	1119 DF	1511 KB	1556 KB	1341 KB	975 DF
TRAIL		1977-	1972-	2123-	*3638-	3142-	2100-	*3264-	*3460-	*3114-	1981-
ONONDAGA	LIMESTONE	2152-	2149-	2300-	3902-	3176-	2276-	3498-	3713-	3348-	2153-
CHERT											
ORISKANY			2372-	2526-	4051-			Absent	Absent	Absent	
HELDERBERG					4060-			3669-	3864-	3519-	
KEYSER-BASS ISLAND		2420-	2442-	2570-	4100-			3708-	3885-	3539-	2394-
SALINA		2634	2645-	2771-	4136-			3732-	3930-	3582-	2646-
GUELPH-LOCKPORT		3065-	3036-	3196-	4674-		3141-	4270-	4498-	4140-	3052-
BLACK WATER											
CANTON		3306-	3286-	3448-	5052-	4526-		4611-	4857-	4476-	3308-
IRONDEQUOIT					5114-	4584-	3485-	4677-	4918-	4537-	
MEDINA		3432-	3405-	3566-	5140-	4647-	3510-	4704-	4944-	4564-	3424-
WHIRLPOOL		Gas @ 3491-3516	Gas @ 3426-3582	Gas @ 3590-3743	Gas @ 5170-5341 5330-	Gas @ 4685-4807 4795-	Gas @ 3536-3573 3690-	Gas @ 4761-4899 4884-	Gas @ 5006-5143 5132-	Gas @ 3444-3600 4747-	
QUEENSTON		3616-	3616-	3746-	5344-	4811-	3695-	4902-	5146-	4762-	3604-
TOTAL DEPTH		3646	3658	3821	5455	4951	3735	5070	5265	4825	3622
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		89 Mcf AF 3 bopd AF 1,070 psi/3 days Springboro pool Comaechville field	74 Mcf AF 4 bopd AF 1,025 psi/3 days new pool discovery Springboro pool Comaechville field	56 Mcf AF 7 bopd AF 1,120 psi/3 days development Springboro pool Comaechville field	764 Mcf AF 1,360 psi/72 hrs new pool discovery Vrooman pool Church Run field	704 Mcf AF 1,340 psi/60 hrs development Athens field	1,500 Mcf AF 1,090 psi/28 days development Lundys Lane pool Comaechville field	365 Mcf AF 1,200 psi/72 hrs development Bristone pool Athens field	1,260 Mcf AF 1,040 psi/72 hrs extension Rome pool Athens field	1,506 Mcf AF RP not given development Athens field	100 Mcf AF 5 bopd AF 1,050 psi/3 days extension Springboro pool Comaechville field

SUMMARIZED RECORDS OF DEEP WELLS

69

COUNTY	Permit Number	Crawford 20655	Crawford 20656	Crawford 20657	Crawford 20659	Crawford 20660	Crawford 20662	Crawford 20663	Crawford 20664	Crawford 20666	Crawford 20667
NAME OF WELL	David & Felicidad Gutierrez #1	James & Helen Anderson #3	Ohio Rubber Company #1	Lillian Lorenz	Edward A. Kocis #1	Joseph W. Arnold #1	Floyd H. & Ruby I. Childs #1	Wainoco Oil & Gas Company #1	Wainoco Oil & Gas Company #1	Louis & Elizabeth Skedel #1	Harley & Ruth Hall #1
O-ERATOR	Northwest Natural Gas Company	Wainoco Oil & Gas Company W-35	Ohio Rubber Company	Wainoco Oil & Gas Company W-29	Cardinal Oil Company	Wainoco Oil & Gas Company W-42	Wainoco Oil & Gas Company W-41	Wainoco Oil & Gas Company W-43	Wainoco Oil & Gas Company W-47	Wainoco Oil & Gas Company W-45	Wainoco Oil & Gas Company W-45
T-OWNSHIP	Spring	Athens	Sumnerhill	Rome	Spring	Athens	Athens	Athens	Athens	Athens	Athens
QUAD-ANGLE & MAP NUMBER	Girard E 493 **Centerville A	Townville C 17 **Centerville B	Linesville B 68 **Harmansburg A	Corry G 51 **Spartansburg G	Girard F 511 **Conneautville B	Townville B 18 **Centerville A	Townville B 19 **Centerville A	Townville B 20 **Centerville A	Union City I 72 **Lake Canadota H	Union City I 72 **Centerville A	Townville C 21 **Centerville B
L-TITUDE	9,550 ft. S 41°52'30"	7,200 ft. S 41°45'00"	400 ft. S 41°45'00"	7,900 ft. S 41°47'30"	13,800 ft. S 41°52'30"	7,800 ft. S 41°45'00"	5,850 ft. S 41°45'00"	8,350 ft. S 41°45'00"	13,100 ft. S 41°47'30"	10,150 ft. S 41°45'00"	10,150 ft. S 41°45'00"
L-NGITUDE	1,350 ft. W 80°20'00"	2,350 ft. W 79°47'30"	8,650 ft. W 80°20'00"	11,000 ft. W 79°42'30"	10,740 ft. W 80°17'30"	10,150 ft. W 79°50'00"	5,600 ft. W 79°50'00"	5,950 ft. W 79°50'00"	6,200 ft. W 79°47'30"	10,800 ft. W 79°47'30"	10,800 ft. W 79°47'30"
D-TE COMPLETED	2-19-80	11-18-79	11-29-79	12-14-79	2-9-80	2-3-80	1-25-80	2-11-80	4-30-80	4-23-80	4-23-80
E-EVATION	1130 GR	1631 KB	970 DF	1511 KB	1553 GR	1261 KB	1381 KB	1391 KB	1511 KB	1331 KB	1331 KB
T-ULLY	2105-	*3404-		3184-	2158-	*2978-	*3108-	*3128-	*3224-	3092-	3092-
ON-NDAGA	2295-	3636-	2391-	3426-	2344-	3206-	3340-	3359-	3458-	3324-	3324-
CH-ERT											
OR-ISKANY		Absent	2490-		2582-	3380-	Absent				
HE-LDERBERG		3805-				3393-	3516-	3530-	3630-		
KEY-SER-BASS ISLAND	2484-	3825-			2626-	3425-	3552-	3560-	3668-		
S-ALINA	2544-	3872-	2675-		2778-	3450-	3587-	3600-	3700-		3778-
GH-ELPH-LOCKPORT	3151-	4457-			3223-	3984-	4122-		4218-		
BL-ACK WATER											
CL-INTON	3425-	4799-			3464-	4332-	4470-	4579-	4579-		
IR-ONDEQUOIT	3490-	4854-		4627-	4391-	4391-	4528-	4556-	4628-	4550-	
ME-UNA	3534-	4880-	3645-	4695-	3596-	4419-	4556-	4584-	4653-	4602-	
WH-IRLPOOL	Gas @ 3542-3612 3659-	Gas @ 4959-5080 5078-	Gas @ 3654-3678 3758- 5083	Gas @ 4679-4853 4839-	Gas @ 3652-3769 4604-	Gas @ 4482-4617 4604-	Gas @ 4659-4751 4738-	Gas @ 4658-4778 4766-	Gas @ 4719-4846 4834-	Gas @ 4634-4725 4764-	
QUEENSTON	3703-	5083-	3772-	4859-	3771-	4620-	4760-	4786-	4848-	4782-	
T-TAL DEPTH	3774	5226	3807	5013	3818	4737	4876	4927	4985	4873	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	2,600 Mcf AF 1,070 psi/72 hrs development Lundys Lane pool Conneaut field	2,450 Mcf AF 1,260 psi/72 hrs development Athens field	250 Mcf AF 1,200 psi/5 days development Indian Springs pool Conneaut field	264 Mcf AF 1,260 psi/3 days development Brimstone pool Athens field	300 Mcf AF 500 psi/3 days development Lundys Lane pool Conneaut field	1,013 Mcf AF 1,260 psi/72 hrs extension Potash Run pool Athens field	654 Mcf AF 1,220 psi/72 hrs development Potash Run pool Athens field	1,629 Mcf AF 1,320 psi/72 hrs development Potash Run pool Athens field	1,178 Mcf AF 1,320 psi/72 hrs development Brimstone pool Athens field	1,218 Mcf AF 1,300 psi/72 hrs development Athens field	1,218 Mcf AF 1,300 psi/72 hrs development Athens field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20668	Crawford 20669	Crawford 20670	Crawford 20672	Crawford 20673	Crawford 20676	Crawford 20677	Crawford 20678	Crawford 20679	Crawford 20680
NAME OF WELL		Charles W. Hawkins #1	Gerald Scouten #1	J. Kimball & Alice Evans #1	David Pruchenski #1	Robert C. Beard #1	Clinton Vance #1	Scott J. Preston #3	Willis O. & Nancy A. Troyer #1	Joseph & Arlene Aversa #1	Robert W. Foltz #1
OPERATOR		Hainoco Oil & Gas Company H-46	Hainoco Oil & Gas Company H-49	Hainoco Oil & Gas Company H-48	Hainoco Oil & Gas Company H-51	Hainoco Oil & Gas Company H-53	Hainoco Oil & Gas Company H-60	Hainoco Oil & Gas Company H-61	Hainoco Oil & Gas Company H-56	Hainoco Oil & Gas Company H-57	Hainoco Oil & Gas Company H-58
TOWNSHIP		Bloomfield	8100field	Rome	Athens	Centerville	Athens	Athens	Athens	Athens	Athens
QUADRANGLE & MAP NUMBER		Union City I 73 **Lake Canadohta I	Union City I 74 **Lake Canadohta I	Corry G 66 **Spartansburg 6	Townville 8 23 **Centerville A	Townville C 22 **Centerville C	Townville C 24 **Centerville B	Townville C 25 **Centerville 8	Townville B 26 **Centerville A	Union City I 85 **Lake Canadohta I	Townville 8 27 **Centerville A
LATITUDE		5,950 ft. S 41°47'30"	2,000 ft. S 41°47'30"	6,900 ft. S 41°47'30"	2,150 ft. S 41°45'00"	1,650 ft. S 41°45'00"	11,600 ft. S 41°45'00"	7,050 ft. S 41°45'00"	3,800 ft. S 41°45'00"	9,350 ft. S 41°47'30"	5,500 ft. S 41°45'00"
LONGITUDE		10,900 ft. W 79°45'00"	10,300 ft. W 79°45'00"	6,250 ft. W 79°42'30"	700 ft. W 79°50'00"	4,250 ft. W 79°45'00"	6,000 ft. W 79°47'30"	8,150 ft. W 79°47'30"	3,200 ft. W 79°50'00"	10,500 ft. W 79°45'00"	1,050 ft. W 79°50'00"
DATE COMPLETED		3-11-80	3-26-80	3-19-80	5-7-80	4-15-80	5-20-80	5-14-80	6-16-80	6-26-80	6-25-80
ELEVATION		1526 KB	1411 KB	1363 KB	1451 KB	1471 KB	1551 KB	1526 KB	1426 KB	1351 KB	1369 KB
TULLY		3186-	*3045-	*3070-	*3179-	*3260-	3352-	*3274-	*3153-	*3056-	3090-
ONONDAGA	LIMESTONE	3424-	3282-	3310-	3416-	3494-	3583-	3506-	3385-	3296-	3320-
CHERT											
ONISKANY			3458-		3587-	3658-		3668-		3468-	
HELDERBERG			3468-	3477-	3608-	3677-		3686-	3554-	3489-	
KEYSER-BASS ISLAND			3504-	3493-	3626-	3696-		3706-	3590-	3507-	
SALINA		3930-	3535-	3538-	3657-	3720-	4019-	3736-	3620-	3536-	3794-
GUELPH-LOCKPORT			4055-	4140-	4190-	4270-		4310-	4176-	3986-	
BLACK WATER											
CANTON			4399-	4456-	4543-	4620-		4658-	4519-	4405-	
IRONDEQUOIT		4608-	4460-	4507-	4595-	4682-	4810-	4715-	4574-	4478-	4530-
MEADINA		4652-	4884-	4534-	4622-	4708-	4862-	4742-	4602-	4504-	4590-
WHIRLPOOL		Gas @ 4656-4826	Gas @ 4534-4679	Gas @ 4500-4732	Gas @ 4545-4715?	Gas @ 4770-4905	Gas @ 4770-4950	Gas @ 4830-4926	Gas @ 4680-4786	Gas @ 4580-4684	Gas @ 4580-4630
QUEENSTON		4830-	4682-	4734-	4821-	4909-	5040-	4947-	4802-	4700-	4756
TOTAL DEPTH		4960	4830	4846	4950	5071	5146	5054	4903	4846	4877
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		2,245 Mcf AF 1,320 psi/72 hrs development Brimstone pool Athens Field	194 Mcf AF 1,300 psi/72 hrs development Brimstone pool Athens Field	324 Mcf AF 1,300 psi/72 hrs development Brimstone pool Athens Field	926 Mcf AF 800 psi/72 hrs development Athens Field	280 Mcf AF 1,320 psi/72 hrs development Brimstone pool Athens Field	434 Mcf AF 1,320 psi/72 hrs development Athens Field	926 Mcf AF 1,190 psi/72 hrs development Athens Field	3,270 Mcf AF 1,250 psi/72 hrs development Potash Run pool Athens Field	1,629 Mcf AF 1,325 psi/72 hrs development Brimstone pool Athens Field	725 Mcf AF 1,310 psi/72 hrs development Athens Field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Crawford 20681	Crawford 20682	Crawford 20683	Crawford 20684	Crawford 20685	Crawford 20686	Crawford 20687	Crawford 20688	Crawford 20689	Crawford 20690
NAME OF WELL		D. E. Crum #1	Randall W. Harkless #1	Elizabeth Gregor #1	Roger C. Hatcher #1	Peter & Margaret Miller #1	Scott J. Preston #2	Elmer G. Snow #1	Thelma A. Smith #1	David Dunn #2	David Dunn #3
OPERATOR		Wainoco Oil & Gas Company W-53	Wainoco Oil & Gas Company W-62	Wainoco Oil & Gas Company W-55	Northwest Natural Gas Company	Northwest Natural Gas Company	Hainoco Oil & Gas Company W-63	Wainoco Oil & Gas Company W-52	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation
TOWNSHIP		Athens	Athens	Athens	Spring	Spring	Athens	Athens	Fairfield	Fairfield	Fairfield
QUADRANGLE & MAP NUMBER		Townville B 28 **Centerville A	Union City H 86 **Lake Canadotia G	Townville B 31 **Centerville A	Girard E 519 **Beaver Center C	Girard H 520 **Beaver Center C	Townville C 29 **Centerville B	Townville C 30 **Centerville B	Meadville H 48 **Cochranon G	Meadville H 49 **Cochranon G	Meadville H 53 **Cochranon G
LATITUDE		7,850 ft. S 41°45'00"	14,800 ft. S 41°47'30"	10,000 ft. S 41°45'00"	14,000 ft. S 41°52'30"	1,100 ft. S 41°50'00"	9,200 ft. S 41°45'00"	4,950 ft. S 41°45'00"	11,000 ft. S 41°32'30"	6,300 ft. S 41°32'30"	8,550 ft. S 41°32'30"
LONGITUDE		200 ft. W 79°50'00"	5,850 ft. W 79°50'00"	2,000 ft. W 79°50'00"	1,200 ft. W 80°22'30"	1,200 ft. W 80°22'30"	7,700 ft. W 79°47'30"	6,000 ft. W 79°47'30"	3,900 ft. W 80°05'00"	3,600 ft. W 80°05'00"	5,150 ft. W 80°05'00"
DATE COMPLETED		5-30-80	6-4-83	6-6-80	6-2-80	5-19-80	6-13-80	6-19-80	6-28-80	7-8-80	7-17-80
ELEVATION		1371 KB	1581 KB	1290 KB	1070 GR	1070 GR	1491 KB	1616 KB	1482 KB	1260 GR	1347 KB
TULLY		*3216-	*3257-	3044-	2068-	2074-	*3250-	*3364-	*3498-		*3272-
ONONDAGA	LIMESTONE	3360-	3490-	3278-	2240-	2248-	3486-	3598-	3691-		3466-
	CHERT										
ORISKANY		3522-	3666-				3647-	3760-	3862-		3640-
HELOERBERG		3544-	3678-				3665-	3775-	3886-		3666-
KEYSER-BASS ISLAND		3574-	3694-		2510-	2510-	3692-	3802-	3926-		3704-
SALINA		3602-	3724-	3724-	2582-	2578-	3717-	3828-	3979-		3757-
GUELPH-LOCKPORT		4162-	4270-		3142-	3149-	4216-	4398-	4640-	*4480-	4388-
BLACK WATER											
CLINTON		4511-	4613-		3378-	3398-	4628-	4740-	5001-	4842-	4762-
IRONDEQUOIT		4570-	4670-	4500-	3478-	3496-	4704-	4800-	5060-	4900-	4822-
MEQUINA		4596-	4706-	4553-	3508-	3527-	4728-	4826-	5096-	4936-	4854-
WHIRLPOOL		Gas @ 4799	Gas @ 4762-4902	Gas @ 4470-4725	Gas @ 3532-3689	Gas @ 3593-3707	Gas @ 4835-4938	Gas @ 4840-4940	Gas @ 5172-5313	Gas @ 5028-5154	Gas @ 4931-5059
QUEENSTON		4782-	4890	4716-	3696-	3704-	4932-	5010-	5300-	5140-	5059
		4800-	4908	4734-	3693-	3711-	4931-	5026-	5317-	5158-	5074
TOTAL DEPTH		4916	5000	4766	3743	3805	5089	5143	5423	5275	5202
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		316 Mcf AF 1,300 psi/72 hrs development Athens field	265 Mcf AF 940 psi/72 hrs development Potash Run pool Athens field	966 Mcf AF 1,350 psi/72 hrs development Athens field	1,800 Mcf AF 1,150 psi/48 hrs development Lundys Lane pool Conneaut field	1,700 Mcf AF 1,150 psi/48 hrs development Lundys Lane pool Conneaut field	3,540 Mcf AF 1,300 psi/72 hrs development Athens field	1,178 Mcf AF 1,325 psi/72 hrs development Athens field	267 Mcf AF 5,994 Mcf AF 1,400 psi/72 hrs Kantz Corners field	440 Mcf AF 3,916 Mcf AF 1,450 psi/72 hrs Kantz Corners field	2,058 Mcf AF 1,450 psi/72 hrs development Kantz Corners field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20691	Crawford 20692	Crawford 20693	Crawford 20698	Crawford 20699	Crawford 20701	Crawford 20702	Crawford 20703	Crawford 20704	Crawford 20705
NAME OF WELL		Ronald R. Longo #1	Allan Hart #2	David Dunn #1	William Prather #1	Robert Morrell #1	Hugh Peterson #1	Robert Frankenfield #1	Eleanor St. John #1	Neil B. Whitman #1	Robert T. Walker #1
OPERATOR		Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Wainoco Oil & Gas Company W-68	Wainoco Oil & Gas Company W-65	Wainoco Oil & Gas Company W-67	Wainoco Oil & Gas Company W-66
TOWNSHIP		Fairfield	Fairfield	Fairfield	East Fairfield	East Fairfield	Fairfield	Rome	Rome	Bloomfield	Centerville
MAP QUADRANGLE & NUMBER		Medville I 47 Cochran H	Medville H 72 Cochran G	Medville H 57 Cochran G	Medville H 58 Cochran O	Medville I 50 Cochran E	Medville H 51 Cochran G	Corry G 80 Spartansburg G	Corry G 81 Spartansburg G	Union City I 91 Lake Canada L	Townville C 32 Centerville C
LATITUDE		7,400 ft. S 41°32'30"	2,800 ft. S 41°32'30"	10,050 ft. S 41°32'30"	14,050 ft. S 41°35'00"	13,900 ft. W 41°35'00"	5,700 ft. S 41°32'30"	9,750 ft. S 41°47'30"	8,300 ft. S 41°47'30"	1,450 ft. S 41°47'30"	6,550 ft. S 41°45'00"
LONGITUDE		10,800 ft. W 80°02'30"	7,000 ft. W 80°05'00"	50 ft. W 80°05'00"	450 ft. W 80°05'00"	6,850 ft. W 80°02'30"	6,550 ft. W 80°05'00"	6,150 ft. W 79°42'30"	8,600 ft. W 79°42'30"	7,550 ft. W 79°45'00"	5,600 ft. W 79°45'00"
DATE COMPLETED		7-1-80	9-17-80	8-10-80	7-15-80	7-31-80	8-7-80	7-19-80	7-2-80	9-24-80	7-3-80
ELEVATION		1350 KB	1122 KB	1452 KB	1232 KB	1350 GR	1171 KB	1330 GR	1542 KB	1491 KB	1301 KB
TULLY		+3376-	+3090-	+3490-		+3342-	+3168-	+3069-	+3242-	+3118-	+3112-
ONONDAGA LIMESTONE		3569-	3284-	3686-		3550-	3360-	3309-	3482-	3354-	3348-
CHERT											
ORISKANY		3740-		3854-		3725-	3535-			3527-	3514-
HELDERBERG		3768-	3460-	3880-		3748-	3553-	3475-	3644-	3545-	3528-
KEYSER-BASS ISLAND		3810-	3514-	3900-		3781-	3570-	3494-	3672-	3562-	3542-
SALINA		3858-	3564-	3971-		3836-	3648-	3539-	3716-	3590-	3583-
GUELPH-LOCKPORT			4193-	4643-		4062-	4288-	4100-	4289-	4126-	4140-
BLACK WATER											
CANTON			4568-	5000-		4826-	4660-	4456-	4637-	4454-	4483-
IRONDEQUOIT			4624-	5063-		4886-	4718-	4515-	4690-	4534-	4549-
MEDINA			4658-	5098-	*4815-	4919-	4752-	4540-	4715-	4560-	4574-
WHIRLPOOL			Gas @ 4721-4874	Gas @ 5304-5316	Gas @ 4834-5027	Gas @ 4978-5139	Gas @ 4784-4954	Gas @ 4596-4734	Gas @ 4782-4912	Gas @ 4623-4755	Gas @ 4640-4772
			4858-	5302-	5012-	5120-	4950-	4721-	4896-	4736-	4751-
QUEENSTON			4875-	5318-	5032-	5138-	4968-	4740-	4915-	4758-	4776-
TOTAL DEPTH		5096	5000	5420	5088	5244	5045	4855	5011	4915	4856
DEEPEST FORMATION REACHED		Medina	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		Plugged and abandoned Lost drill collar in hole development Kantz Corners field	49 Mcf Nat. 1,205 Mcf AF 1,375 psi/72 hrs development Kantz Corners field	2,500 Mcf AF 1,400 psi/72 hrs development Kantz Corners field	1,008 Mcf AF 1,650 psi/72 hrs new pool discovery Shaws Corners Pool Kantz Corners field	1,100 Mcf AF 1,250 psi/72 hrs new pool East Fairfield pool Kantz Corners field	45 Mcf Nat. 1,100 Mcf AF 1,450 psi/72 hrs development Kantz Corners field	1,218 Mcf AF 1,200 psi/72 hrs development Bristone pool Athens field	1,547 Mcf AF 1,160 psi/72 hrs development Bristone pool Athens field	1,635 Mcf AF 1,310 psi/72 hrs development Bristone pool Athens field	805 Mcf AF 1,340 psi/72 hrs development Athens field

SUMMARIZED RECORDS OF DEEP WELLS

COUNTY	Permit Number	Crawford 20706	Crawford 20708	Crawford 20710	Crawford 20711	Crawford 20712	Crawford 20713	Crawford 20715	Crawford 20716	Crawford 20717	Crawford 20719
NAME OF WELL	Wayne V. Parker #1	Charles R. & Regina C. Broad #1	John Frank Steigenwald #1	Peter F. Stagl #1	Anna Naas #1	William D. & Nancy A. Kidd #1	Leroy Schweitzer #1	Scott J. Preston #4	Andy N. Gingerich #1	Robert Johnson #1	
OPERATOR	Wainoco Oil & Gas Company #4-64	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Northwest Natural Gas Company	Wainoco Oil & Gas Company #4-69	Wainoco Oil & Gas Company #4-71	Wainoco Oil & Gas Company #4-70	Cabot Oil & Gas Corporation	
TOWNSHIP	Rome	Spring	Spring	Spring	Spring	Spring	Spring	Athens	Sparta	East Fairfield	
QUADRANGLE & MAP NUMBER	Union City I 87 **Lake Canadonha I	Girard E 521 **Conneautville A	Girard H 522 **Conneautville B	Girard H 523 **Conneautville D	Girard H 524 **Conneautville B	Girard H 525 **Conneautville D	Union City I 92 **Lake Canadonha I	Townville C 39 **Centerville B	Union City I 93 **Lake Canadonha I	Meadville H 52 **Cochranon H 50	
LATITUDE	10,650 ft. S 41°47'30"	11,050 ft. S 41°52'30"	2,750 ft. S 41°50'00"	1,850 ft. S 41°50'00"	700 ft. S 41°50'00"	1,900 ft. S 41°50'00"	1,450 ft. S 41°47'30"	7,100 ft. S 41°45'00"	450 ft. S 41°47'30"	9,700 ft. S 41°30'00"	
LONGITUDE	150 ft. W 79°45'00"	8,350 ft. W 80°20'00"	3,250 ft. W 80°20'00"	4,550 ft. W 80°20'00"	2,600 ft. W 80°20'00"	1,900 ft. W 80°20'00"	4,200 ft. W 79°45'00"	5,450 ft. W 79°47'30"	800 ft. W 79°45'00"	2,450 ft. W 80°05'00"	
DATE COMPLETED	7-11-80	7-26-80	6-29-80	7-15-80	7-9-80	7-3-80	9-16-80	8-24-80	9-9-80	7-18-80	
ELEVATION	1441 KB	1110 GR	1165 GR	1160 GR	1150 GR	1165 GR	1540 GR	1631 KB	1600 KB	1351 KB	
TULLY	*3187-	2093-	2212-	2182-	2160-	2206-	*3196-	*3388-	*3238-	*3278-	
ONONDAGA	3427-	2268-	2394-	2363-	2342-	2387-	3430-	3620-	3478-	3473-	
ORISKANY	3590-						3604-	3780-	3640-	3651-	
HELDERBERG	3614-						3620-	3806-	3655-	3673-	
KEYSER-BASS ISLAND	3632-	2532-	2640-	2614-	2592-	2635-	3636-	3820-	3672-	3704-	
SALINA	3660-	2605-	2706-	2686-	2656-	2700-	3668-	3850-	3699-	3762-	
GULPH-LOCKPORT	4236-	3145-	3268-	3250-	3220-	3250-	4214-		4265-	4336-	
BLACK WATER											
CLINTON	4568-	3386-	3514-	3498-	3456-	3492-	4551-		4610-	4703-	
IRONDEQUOIT	4631-	3482-	3608-	3602-	3554-	3589-	4620-	4833-	4671-	4762-	
MEDINA	4659-	3510-	3638-	3633-	3584-	3619-	4646-	4887-	4696-	4794-	
WHIRLPOOL	Gas @ 4720-4857	Gas @ 3548-3602	Gas @ 3674-3821	Gas @ 3691-3729	Gas @ 3617-3669	Gas @ 3652-3705	Gas @ 4703-4835	Gas @ 4927-5062	Gas @ 4752-4887	Gas @ 4911-5004	
QUEENSTON	4842-	3686	3819-	3813-	3760-	3794-	4824-	5044-	4874-	4992-	
	4862-	3694	3825-	3821-	3766-	3797-	4838-	5061-	4890-	5008-	
TOTAL DEPTH	4981	3715	3855	3842	3804	3824	4976	5106	5010	5116	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	487 Mcf AF 1,250 psi/72 hrs development Brinscone pool Athens field	1,500 Mcf AF 1,070 psi/48 hrs development Lundys Lane pool Conneaut field	1,500 Mcf AF 1,155 psi/48 hrs development Lundys Lane pool Conneaut field	2,100 Mcf AF 1,150 psi/48 hrs development Lundys Lane pool Conneaut field	1,750 Mcf AF 1,150 psi/48 hrs development Lundys Lane pool Conneaut field	1,700 Mcf AF 1,125 psi/48 hrs development Lundys Lane pool Conneaut field	894 Mcf AF 1,270 psi/72 hrs extension Brinscone pool Athens field	337 Mcf AF 1,260 psi/72 hrs development Athens field	113 Mcf AF 1,265 psi/72 hrs extension Brinscone pool Athens field	984 Mcf AF 1,325 psi/72 hrs extension Shaws Corners pool Kantz Corners field	

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20720	Crawford 20722	Crawford 20725	Crawford 20726	Crawford 20727	Crawford 20728	Crawford 20729	Crawford 20731	Crawford 20732	Crawford 20733
NAME OF WELL	James Mumford #1	Walter Pearl #1	Horace Hart #1	Thomas Bloese, et al. #1	Harry Zimmer #1	Noah Wengerd #1	Dennis A. Phillips #1	George Bancroft #2	Archie Lthgo #1	Mildred R. Merry #1	
OPERATOR	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Wainoco Oil & Gas Company W-73	Wainoco Oil & Gas Company W-74	Wainoco Oil & Gas Company W-75	Wainoco Oil & Gas Company W-76	
TOWNSHIP	Fairfield	Wayne	Fairfield	East Fairfield	Union	Randolph	Athens	Athens	Steuben	Athens	
QUADRANGLE & MAP NUMBER	Headville H 63 **Cochran G	Headville I 59 **Cochran F	Headville H 54 **Geneva I	Headville H 55 **Cochran D	Headville H 60 **Geneva F	Townville D 35 **Sugar Lake A	Townville B 40 **Centerville A	Townville B 33 **Centerville A	Townville C 34 **Centerville B	Townville B 36 **Centerville A	
LATITUDE	7,200 ft. S 41°32'30"	6,900 ft. S 41°35'00"	5,300 ft. S 41°32'30"	12,350 ft. S 41°35'00"	12,950 ft. S 41°25'00"	650 ft. S 41°37'30"	4,300 ft. S 41°45'00"	1,000 ft. S 41°45'00"	15,000 ft. S 41°45'00"	12,050 ft. S 41°45'00"	
LONGITUDE	10,600 ft. W 80°05'00"	5,100 ft. W 80°00'00"	900 ft. W 80°07'30"	2,900 ft. W 80°05'00"	5,450 ft. W 80°07'30"	9,450 ft. W 79°57'30"	8,350 ft. W 79°50'00"	8,500 ft. W 79°50'00"	1,100 ft. W 79°47'30"	6,850 ft. W 79°50'00"	
DATE COMPLETED	8-22-80	8-6-80	8-14-80	8-3-80	8-30-80	8-26-80	8-2-80	7-26-80	7-27-80	7-21-80	
ELEVATION	1212 KB	1481 KB	1101 KB	1300 GR	1372 KB	1522 KB	1391 KB	1501 KB	1590 GR	1262 KB	
TITLE	*3198-	*3441-	3054-	*3253-	*3252-	*3407-	*3096-	*3192-	*3304-	*3012-	
ONONDAGA LIMESTONE	3306-	3653-	3260-	3452-	3435-	3598-	3324-	3418-	3536-	3244-	
CHERT											
ONISKANY	3563-	3828-	3439-	3628-	3625-	3778-	3495-	3594-	Absent	3412-	
HELDERBERG	3586-	3850-	3463-	3650-	3640-	3790-	3509-	3604-	3700-	3440-	
KEYSER-BASS ISLAND	3618-	3886-	3490-	3667-	3678-	3829-	3530-	3618-	3719-	3458-	
SILINA	3670-	3941-	3545-	3735-	3730-	3876-	3557-	3652-	3762-	3487-	
GUELPH-LOCKPORT BLACK WATER	4319-	4546-	4178-	4333-	4356-	4466-	4086-	4458-	4344-	4046-	
CANTON	4678-	4905-	4548-	4705-	4724-	4824-	4434-	4528-	4691-	4406-	
IRONDEQUOIT	4738-	4966-	4603-	4762-	4780-	4885-	4494-	4588-	4748-	4457-	
MEDINA WHIRLPOOL	4772- Gas @ 4832-4990 4976-	4997- Gas @ 5060-5208 5196-	4636- Gas @ 4697-4848 4837	4796- Gas @ 4855-5009 4994-	4812- Gas @ 4872-5028 5016-	4914- Gas @ 4958-5126 5111-	4519- Gas @ 4612-4715 4700-	4597- Gas @ 4831-4975 4961-	4773- Gas @ 4831-4975 4961-	4483- Gas @ 4539-4683 4659-	
QUEENSTON	4992-	5210-	4852	5012-	5030-	5128-	4718	4812-	4979-	4688-	
TOTAL DEPTH	5096	5320	4965	5129	5107	5245	4870	4911	5090	4777	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	298 Mcf Nat. 1,320 Mcf AF 1,450 psi/72 hrs Kantz Corners field	Production too small to measure new field wildcat	1,250 Mcf AF 1,450 psi/72 hrs extension Kantz Corners field	1,043 Mcf AF 1,500 psi/72 hrs development Shaws Corners pool	696 Mcf AF 1,200 psi/72 hrs new pool discov. pool Kantz Corners field	462 Mcf AF 1,300 psi/72 hrs new pool discovery Guys Mills pool Frenchtown field	412 Mcf AF 1,280 psi/72 hrs development Potash Run pool Athens field	1,525 Mcf AF 1,100 psi/72 hrs development Potash Run pool Athens field	845 Mcf AF 1,320 psi/72 hrs extension Athens field	1,013 Mcf AF 1,200 psi/72 hrs development Potash Run pool Athens field	

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Crawford 20734	Crawford 20735	Crawford 20738	Crawford 20739	Crawford 20743	Crawford 20755	Crawford 20761	Crawford 20763	Crawford 20765	Crawford 20766
N ^o ME OF WELL		Herbert J. Kimby #1	Albert F. Scott #1	Joseph Mullet #1	Lawrence Abbott #1	David C. Slusser #1	Ronald R. Longo #1-S	W. L. Dunn #4	Victor Babyak #1	Donald B. Hulley #1	Theima Smith #2
O ^o ERATOR		Wainoco Oil & Gas Company W-77	Wainoco Oil & Gas Company W-78	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Wainoco Oil & Gas Company W-81	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation
T ^o WN ^o SHIP		Athens	Athens	Randolph	Fairfield	Athens	Fairfield	Greenwood	Fairfield	Fairfield	Fairfield
QUADRANGLE & MAP NUMBER		Townville B 38 **Centerville A	Townville C 41 **Centerville B	Townville D 37 **Sugar Lake A	Meadville H 61 **Geneva I	Union City H 94 **Lake Canadota G	Meadville I 56 **Cochranon H	Meadville G 64 **Geneva H	Meadville H 65 **Cochranon G	Meadville H 66 **Cochranon G	Meadville H 62 **Cochranon G
L ^o ATITUDE		700 ft. S 41°45'00"	12,050 ft. S 41°45'00"	12,500 ft. S 41°37'30"	4,950 ft. S 41°32'30"	11,650 ft. S 41°47'30"	7,300 ft. S 41°32'30"	6,400 ft. S 41°32'30"	12,750 ft. S 41°32'30"	11,500 ft. S 41°32'30"	8,350 ft. S 41°32'30"
L ^o NGITUDE		3,400 ft. W 79°50'00"	800 ft. W 79°47'30"	11,000 ft. W 79°57'30"	6,550 ft. W 80°07'30"	9,950 ft. W 79°50'00"	11,100 ft. W 80°02'30"	6,650 ft. W 80°10'00"	1,600 ft. W 80°05'00"	6,950 ft. W 80°05'00"	7,800 ft. W 80°05'00"
D ^o YE COMPLETED		7-13-80	8-3-80	8-17-80	8-28-80	8-8-80	7-25-80	9-14-80	9-14-80	9-7-80	8-30-80
ELEVATION		1542 KB	1601 KB	1486 KB	1160 KB	1531 KB	1330 GR	1332 KB	1442 KB	1362 KB	1252 KB
T ^o LLY		*3236-	*3411-	*3424-	*3058-	*3142-	*3364-	*3236-	*3488-	*3380-	*3252-
ONONDAGA	LIMESTONE	3469-	3644-	3639-	3238-	3374-	3562-	3396-	3682-	3570-	3444-
CHERT											
ORISKANY		3640-	Absent	3814-	3422-	3546-	3729-	3588-	3852-	3745-	3619-
HELDERBERG		3654-	3814-	3834-	3440-	3560-	3751-	3602-	3582-	3764-	3642-
KEYSER-BASS ISLAND		3672-	3837-	3870-	3475-	3571-	3791-	3644-	3920-	3806-	3680-
SALINA		3701-	3882-	3919-	3524-	3601-	3854-	3693-	3972-	3857-	3730-
G ^o ELPH-LOCKPORT		4244-	4456-	4543-	4162-	4144-	4498-	4322-	4644-	4526-	4386-
BLACK WATER											
C ^o INTON		4596-	4801-	4898-	4527-	4493-	4866-	4708-	5004-	4878-	4744-
IRONDEQUOIT		4654-	4859-	4961-	4587-	4550-	4926-	4755-	5064-	4938-	4802-
MEDINA		4680-	4885-	4990-	4620-	4579-	4960-	4788-	5098-	4974-	4835-
WHIRLPOOL		Gas @ 4744-4875	Gas @ 4954-5085	Gas @ 5049-5202	Gas @ 4646-4834	Gas @ 4637-4775	Gas @ 5030-5177	Gas @ 4843-5003	Gas @ 5762-5312	Gas @ 5039-5195	Gas @ 4896-5053
QUEENSTON		4862-	5070-	5186-	4822-	4756-	5166-	4990-	5302-	5180-	5040-
		4878-	5088-	5205-	4836-	4778-	5180-	5005-	5314-	5196-	5052-
TOTAL DEPTH		4948	5257	5317	4934	4871	5219	5140	5438	5286	5161
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		725 Mcf AF 1,200 psi/72 hrs Athens field	1,719 Mcf AF development Athens field	1,032 Mcf AF 1,350 psi/72 hrs new field discovery Frenchtown field	678 Mcf AF 1,350 psi/72 hrs extension Kantz Corners field	933 Mcf AF 1,290 psi/72 hrs development Potash Run pool Athens field	84 Mcf AF 2,768 Mcf AF 1,450 psi/72 hrs development Kantz Corners field	103 Mcf AF 1,250 psi/72 hrs extension Rock Creek pool Geneva field	1,950 Mcf AF 1,400 psi/72 hrs development Kantz Corners field	260 Mcf AF 1,970 Mcf AF 1,425 psi/72 hrs development Kantz Corners field	231 Mcf AF 2,600 Mcf AF 1,375 psi/72 hrs development Kantz Corners field

Figure 36. (Continued)

COUNTY	Permit Number	Crawford 20767	Crawford 20768	Crawford 20783	Crawford 20785	Crawford 20787	Crawford 20797	Crawford 20820	Crawford 20821	Crawford 20826	Crawford 20835
NAME OF WELL	Wagnercrest Farms #1	TheIstoin Williams #1	John M. Kaminski #1	Grace Clark S111 Estate #1	Seth P. Balllog #1	Joseph W. Miller #1	Frank & Marie Laush #1	William & Coletta Motzing #1	Larry Hart #1	P. & C. Cortelyou #1	
OPERATOR	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Northwest Natural Gas Company	Mainoco Oil & Gas Company W-83	Mainoco Oil & Gas Company W-84	Mainoco Oil & Gas Company W-50	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	
TOWNSHIP	Fairfield	Fairfield	Spring	Athens	Bloomfield	Bloomfield	Bloomfield	Fairfield	Fairfield	Fairfield	
QUADRANGLE & MAP NUMBER	Meadville H 67 **Geneva I	Meadville H 68 **Geneva I	Girard H 526 **Conneautville 0	Union City I 95 **Lake Canadota 1	Union City I 96 **Lake Canadota 1	Union City I 97 **Lake Canadota E	Meadville I 69 **Cochran H	Meadville H 70 **Geneva I	Meadville H 71 **Cochran G	Stoneboro C 23 **New Lebanon 8	
LATITUDE	6,150 ft. S 41°32'30"	8,950 ft. S 41°32'30"	3,300 ft. S 41°50'00"	12,900 ft. S 41°47'30"	1,300 ft. S 41°47'30"	8,250 ft. S 41°50'00"	14,300 ft. S 41°32'30"	9,350 ft. S 41°32'30"	10,500 ft. S 41°32'30"	1,800 ft. S 41°30'00"	
LONGITUDE	3,900 ft. W 80°07'30"	3,850 ft. W 80°07'30"	5,950 ft. W 80°20'00"	7,450 ft. W 79°45'00"	9,650 ft. W 79°47'30"	7,400 ft. W 79°47'30"	10,350 ft. W 80°02'30"	7,400 ft. W 80°07'30"	10,400 ft. W 80°05'00"	11,150 ft. W 80°02'30"	
DATE COMPLETED	9-15-80	9-21-80	8-12-80	10-1-80	8-16-80	8-31-80	10-4-80	9-27-80	9-25-80	10-4-80	
ELEVATION	1136 KB	1281 KB	1150 GR	1491 KB	1381 KB	1561 KB	1397 KB	1352 KB	1291 KB	1422 KB	
TULLY	*3102-	*3254-	2165-	*3242-	*2954-	*3080-	*3462-	*3317-	*3265-	*3517-	
ONONDAGA	3284-	3436-	2342-	3476-	3190-	3317-	3659-	3495-	3482-	3715-	
CHERT											
ONISKANY	3466-	3612-		3643-	3365-	3492-	3825-	3676-	3657-	3879-	
HELDERBERG	3485-			3663-	3376-	3504-	3843-	3693-	3677-	3899-	
KEYSER-BASS ISLAND	3525-	3628-	2594-	3678-	3390-	3514-	3897-	3732-	3981-	3950-	
SALINA	3590-	3722-	2670-	3707-	3420-	3546-	3944-	3784-	4000-	4000-	
GUELPH-LOCKPORT	4210-	4370-	3234-	4252-	3952-	4088-	4618-	4428-	4426-	4681-	
BLACK WATER											
CLINTON	4572-	4735-	3484-	4607-	4308-	4417-	4982-	4796-	4793-	5042-	
IRONDEQUOIT	4630-	4795-	3588-	4664-	4366-	4495-	5041-	4851-	4906-	5099-	
MEDINA	4665-	4828-		4590-	4391-	4520-	5080-	4884-	4906-	5138-	
WHIRLPOOL	Gas @ 4735-4884 4868-	Gas @ 4889-5042 5030-	Gas @ 3645-3711 3796-	Gas @ 4748-4882 4873-	Gas @ 4453-4591 4573-	Gas @ 4548-4708 4698-	Gas @ 5197-5295 5283-	Gas @ 4993-5105 5092-	Gas @ 4962-5105 5093-	Gas @ 5209-5353 5345-	
QUEENSTON	4885-	5042-	3798-	4886-	4596-	4712-	5295-	5107-	5109-	5355-	
TOTAL DEPTH	4993	5140	3845	4975	4658	4841	5402	5196	5187	5460	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	94 Mcf Nat. 1,850 Mcf AF 1,400 psi/72 hrs Kantz Corners field	1,046 Mcf AF 1,225 psi/72 hrs development Kantz Corners field	1,000 Mcf AF 1,150 psi/48 hrs development Lundys Lane pool Comeaut field	2,144 Mcf AF 1,280 psi/72 hrs development Brimstone pool Athens field	311 Mcf AF 1,350 psi/72 hrs new pool discovery Lincolnville pool Athens field	381 Mcf AF 1,250 psi/72 hrs new pool discovery Ousch H11 pool Athens field	1,032 Mcf AF 1,375 psi/72 hrs development Kantz Corners field	1,205 Mcf AF 1,375 psi/72 hrs extension Kantz Corners field	2,610 Mcf AF 1,200 psi/72 hrs development Kantz Corners field	1,970 Mcf AF 1,300 psi/72 hrs development Kantz Corners field	

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	permit Number	Crawford	Crawford	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
		20036	20858	20521	20538	20559	20562	20565	20571	20576	20583	
NAME OF WELL	William Cummings #1	Michael & Marie Lavor #1	William Chapman #1	Gary Laboski #2	Kenneth Yost #1	Josephine Lang-Coile Station #7B-1	Josephine Lang-Coile Station #7B-2	Josephine Lang-Coile Station #7B-3	Josephine Lang-Coile Station #7B-2	Gary Anderson #1	James A. Bernet #1	
OPERATOR	Cabot Oil & Gas Corporation	Northwest Natural Gas Company	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Local Energy, Inc.	Local Energy, Inc.	Local Energy, Inc.	Local Energy, Inc.	Envirogas, Inc.	JAR Enterprises, Inc.	
TOWNSHIP	Fairfield	Spring	North East	Harborcreek	Greenfield	Greenfield	Greenfield	Greenfield	Greenfield	Harborcreek	Harborcreek	
QUADRANGLE	Stonboro C 24	Girard H 527	North East B 165	North East A 166	North East E 167	North East F 252	North East F 253	North East F 253	North East F 254	North East D 175	North East B 245	
MAP	**New Lebanon B	**Conneautville D	**Harborcreek F	**Harborcreek E	**Wattsburg A	**Wattsburg B	**Wattsburg B	**Wattsburg B	**Wattsburg B	**Harborcreek H	**Harborcreek F	
LATITUDE	1,800 ft. S 41°30'00"	3,250 ft. S 41°50'00"	12,100 ft. S 40°12'30"	13,475 ft. S 42°12'30"	2,320 ft. S 42°07'30"	4,850 ft. S 42°07'30"	3,100 ft. S 42°07'30"	3,100 ft. S 42°07'30"	2,100 ft. S 42°07'30"	9,825 ft. S 42°10'00"	11,650 ft. S 42°12'30"	
LONGITUDE	8,600 ft. W 60°02'30"	4,700 ft. W 80°20'00"	4,050 ft. W 79°52'30"	4,800 ft. W 79°55'00"	3,150 ft. W 79°50'00"	11,100 ft. W 79°47'30"	8,300 ft. W 79°47'30"	8,300 ft. W 79°47'30"	8,050 ft. W 79°47'30"	8,700 ft. W 79°55'00"	9,650 ft. W 79°52'30"	
DATE COMPLETED	10-9-80	10-9-80	6-17-78	6-10-78	7-28-78	7-12-78	7-24-78	7-24-78	7-24-78	9-7-78	8-16-78	
ELEVATION	1381 K8	1145 GR	900 K8	760 K8	1545 K8	1395 GR	1390 GR	1390 GR	1433 GR	1040 K8	810 K8	
TULLY	*3485-	2157-	1412-	1257-	2227-					1616-	1275-	
ONONDAGA	3606-	2388-	1634-	1480-	2450-					1842-	1459-	
CHERT												
ORISKANY	3852-											
HELDERBERG	3868-											
KEYSER-BASS ISLAND	3923-	2598-										
SILINA	3972-	2668-										
GUELPH-LOCKPORT	4648-	3234-	2340-	2188-	3103-					2571-	2160-	
BLACK WATER												
CANTON	5003-	3404-										
IRONDEQUIT	5053-	3570-	2653-	2501-	3407-					2882-	2542-	
MEDINA	5100-	3607-	2608-	2579-	3550-	3421-	3434-	3434-	3452-	2072-	2586-	
WHIRLPOOL	Gas @ 5174-5314 5305-	Gas @ 3660-3704 3790-	Gas @ 2700-2845 2824-	Gas @ 2550-2688 2672-	Gas @ 3552-3687 3670-	Gas @ 3422-3551 3541-	Gas @ 3434-3470 3554-	Gas @ 2830-3074 3058-	Gas @ 3454-3499 3564-	Gas @ 2830-3074 3058-	Gas @ 2582-2732 2714-	
QUEENSTON	5316-	3792-	2847-	2601-	3600-	3554-	3565-	3565-	3506-	3075-	2736-	
TOTAL DEPTH	5364	3850	2938	2765	3771	3560	3651	3651	3687	3137	2776	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	2,520 Mcf AF 1,400 psi/72 hrs development Kantz Corners field	1,100 Mcf AF 1,150 psi/40 hrs development Lundys Lane pool Conneaut field	200 Mcf AF 870 psi/10 days development Burgess pool North East field	Junked and abandoned well Mechanical failure development Harborcreek pool North East field	150 Mcf AF 900 psi/10 days development Hornby pool North East field	450 Mcf AF Rt not given extension Hornby pool North East field	450 Mcf AF Rt not given extension Hornby pool North East field	Non-commercial gas well development Hornby pool North East field	Non-commercial gas well development Hornby pool North East field	49 Mcf AF 820 psi/10 days development Harborcreek pool North East field	958 Mcf AF 770 psi/7 development Burgess pool North East field	

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20584	Erie 20585	Erie 20587	Erie 20600	Erie 20628	Erie 20638	Erie 20646	Erie 20690	Erie 20694	Erie 20710
NAME OF WELL	James A. Bernet #2	James A. Bernet #4	James A. Bernet #3	James A. Bernet #3	Carl Beckman #3	Bermwood Heights #2	John Jingliski #1	David H. Wagner #1	Ralph Heidler #1	William Klenz #2	Roy Thomson #1
OPERATOR	JAB Enterprises, Inc.	JAB Enterprises, Inc.	JAB Enterprises, Inc.	JAB Enterprises, Inc.	Envirogas, Inc.	JAB Enterprises, Inc.	Appalachian Energy, Inc. AE-33	Wineyard Oil & Gas Company	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.
TOWNSHIP	Harborecreek	Harborecreek	Harborecreek	Harborecreek	Harborecreek	Harborecreek	Wayne	North East	Fairview	North East	North East
QUADRANGLE & MAP NUMBER	North East B 246 **Harborecreek F	North East B 247 **Harborecreek F	North East B 248 **Harborecreek F	North East B 249 **Harborecreek F	North East E 264 **Harborecreek I	North East D 295 **Harborecreek G	Corry B 61 **Corry F	North East B 297 **North East A	Fairview I 6 **Fairview I	North East B 265 **Harborecreek F	North East B 261 **North East D
LATITUDE	10,750 ft. S 42°12'30"	9,800 ft. S 42°12'30"	9,130 ft. S 42°12'30"	8,120 ft. S 42°12'30"	1,400 ft. S 42°10'00"	7,600 ft. S 42°10'00"	490 ft. S 41°57'30"	6,650 ft. S 42°15'00"	7,600 ft. S 42°02'30"	14,700 ft. S 42°12'30"	9,100 ft. S 41°12'30"
LONGITUDE	7,700 ft. W 79°52'30"	10,050 ft. W 79°52'30"	8,120 ft. W 79°52'30"	8,120 ft. W 79°52'30"	10,450 ft. W 79°52'30"	9,950 ft. W 79°52'30"	1,140 ft. W 79°37'30"	2,250 ft. W 79°50'00"	4,350 ft. W 80°15'00"	4,700 ft. W 79°52'30"	8,600 ft. W 79°50'00"
DATE COMPLETED	9-6-78	9-26-78	9-18-78	9-18-78	10-21-78	10-29-78	12-2-78	12-1-78	5-22-79	2-20-80	3-4-80
ELEVATION	825 DF	785 DF	785 DF	785 DF	890 GR	738 GR	1558 DF	818 DF	818 DF	944 DF	920 GR
TULLY	1302-	1270-	1257-	1257-	1422-	1277-		1175-	1340-	1462-	1429-
ONONDAGA	1504-	1450-	1441-	1441-	1640-	1472-	*3080-	1330-	1548-	1685-	1652-
CHERT					Bois Blanc @ 1873				Bois Blanc @ 1885	Bois Blanc @ 1885	Bois Blanc @ 1851
ONISKANY							Absent		1830-		
HELDERBERG											
KEYSER-BASS ISLAND	1663-	1674-	1636-	1636-	1900-		3277-		1838-	1938-	1912-
SALINA	1821-	1822-	1790-	1790-	2011-		3332-		1988-	2044-	2001-
GUELPH-LOCKPORT	2284-	2254-	2154-	2154-		2252-	3898-	2190-	2401-	2397-	2355-
BLACK WATER											
CANTON	2496-	2478-	2370-	2370-			4160-	2253-	2653-	2662-	2624-
IRONDEQUOIT	2586-	2516-	2512-	2512-			4220-	2415-	2708-	2712-	2669-
MEDINA	2608-	2550-	2554-	2554-			4244-	2434-	2742-	2736-	2694-
WHIRLPOOL	Gas @ 2645-2755 2742-	Gas @ 2574-2713 2702-	Gas @ 2556-2698 2680-	Gas @ 2556-2698 2680-		Gas @ 2603-2718 2702-	Gas @ 4354-4383 4416-	Gas @ 2332-2567 2558-	Gas @ 2754-2845 2882-	Gas @ 2741-2900 2882-	Gas @ 2717-2861 2840-
QUEENSTON	2764-	2764-	2704-	2704-		2721-	4434-	2572-	2916-	2902-	2863-
TOTAL DEPTH	2800	2755	2755	2755	2250	2766	4505	2572	3005	3000	2977
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Salina	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	894 Mcf AF 774 psi/48 hrs development Burgess pool North East field	678 Mcf AF 790 psi/48 hrs development Burgess pool North East field	958 Mcf AF 774 psi/48 hrs development Burgess pool North East field	958 Mcf AF 774 psi/48 hrs development Burgess pool North East field	Junked and abandoned development Burgess pool North East field	658 Mcf AF 732 psi/24 hrs extension Harborecreek pool North East field	300 Mcf AF 1,150 psi/72 hrs development Brockenstraw field	1,500 Mcf AF 785 psi/24 hrs development Orchard Beach pool North East field	250 Mcf AF 850 psi/10 days new pool Heidler pool Erie field	524 Mcf AF 865 psi/10 days development Burgess pool North East field	4,400 Mcf AF 690 psi/10 days development Burgess pool North East field

COUNTY	Permit Number	Erie 20711	Erie 20714	Erie 20723	Erie 20730	Erie 20733	Erie 20736	Erie 20742	Erie 20755	Erie 20756	Erie 20759
NAME OF WELL		Donald Arlink Tract 2063 #1	Leland Crosscut Tract 2064 #1	William Klenz #1	James Burch #2	Guy Smith #3	Theodore D. Willis #1	James Burch #3	James Burch #1	X. Meehl #3	Guy Smith #1
OPERATOR		Appalachian Energy, Inc. AE-53	Appalachian Energy, Inc. AE-51	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.
TOWNSHIP		Wayne	Wayne	North East	North East	North East	Girard	North East	North East	North East	North East
QUADRANGLE & MAP		Corry A 52 **Corry E	Corry B 53 **Corry C	North East B 270 **North East 0	North East E 235 **Harborecreek 1	North East E 249 **North East 6	Girard C 512 **Albion C	North East E 255 **Harborecreek 1	North East E 256 **Harborecreek 1	North East B 241 **North East D	North East B 242 **North East D
LATITUDE		875 ft. S 41°57'30"	13,850 ft. S 42°00'00"	10,800 ft. S 42°12'30"	1,800 ft. S 42°10'00"	50 ft. S 42°10'00"	950 ft. S 42°00'00"	2,700 ft. S 42°10'00"	1,250 ft. S 42°10'00"	12,300 ft. S 42°12'30"	13,400 ft. S 42°12'30"
LONGITUDE		350 ft. W 79°40'00"	8,840 ft. W 79°37'30"	10,500 ft. W 79°50'00"	5,500 ft. W 79°52'30"	2,800 ft. W 79°50'00"	8,800 ft. W 80°15'00"	2,800 ft. W 79°52'30"	3,750 ft. W 79°52'30"	4,900 ft. W 79°50'00"	3,400 ft. W 79°50'00"
DATE COMPLETED		4-7-79	3-31-79	3-14-80	11-15-79	8-19-79	5-28-79	2-13-80	1-16-80	9-21-79	12-13-79
ELEVATION		1533 OF	1460 DF	935 GR	1060 GR	1300 GR	850 DF	1229 DF	1104 DF	1240 GR	1260 GR
TULLY				1440-	1598-	1847-	1483-	1777-	1634-	1777-	1788-
ONONDAGA	LIMESTONE			1663-	1824-	2071-	1703-	2001-	1856-	2008-	2011-
CHERT				Bois Blanc @ 1861	Bois Blanc @ 2018	Bois Blanc @ 2268		Bois Blanc @ 2201	Bois Blanc @ 2057	Bois Blanc @ 2206	Bois Blanc @ 2213
ORISKANY						1980-		*	2254-		
HELDERBERG											
KEYSER-BASS ISLAND				1903-	2073-	2319-	2000-	2258-	2109-	2250-	2265-
SALINA				2021-	2165-	2432-	2147-	2355-	2204-	2362-	2369-
GUELPH-LOCKPORT				2368-	2539-	2793-	2514-	2716-	2575-	2717-	2720-
BLACK WATER											
CLINTON				2629-	2798-	3046-	2770-	2980-	2833-	2975-	2986-
IRONDEQUOIT				2681-	2853-	3098-	2820-	3027-	2887-	3029-	3039-
MEDINA	4184-		4094-	2707-	2877-	3123-	2858-	3053-	2912-	3062-	3065-
WHIRLPOOL	Gas @ 4202-4276	Gas @ 4167-4195	Gas @ 4167-4195	Gas @ 2730-2874	Gas @ 2884-2967	Gas @ 3160-3290	Gas @ 2861-3024	Gas @ 3060-3218	Gas @ 2933-3074	Gas @ 3077-3218	Gas @ 3089-3231
QUEENSTON	4336- Gas	4240-	4264-	2850-	3022-	3274-	3014-	3200-	3058-	3202-	3215-
	4352-			2877-	3048-	3292-	3026-	3221-	3077-	3221-	3233-
TOTAL DEPTH		4394	4332	2983	3134	3396	3132	3320	3182	3221	3309
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		350 Mcf AF 1,200 psi/772 hrs development Spencer Creek pool Corry field	400 Mcf AF 1,250 psi/772 hrs development Brokenstraw field	1,039 Mcf AF 880 psi/710 days development Burgess pool North East field	1,100 Mcf AF 270 psi/710 days development Burgess pool North East field	677 Mcf AF 965 psi/710 days development Burgess pool North East field	200 Mcf AF 900 psi/710 days new pool discovery Brandy Run pool Erie field	259 Mcf AF 775 psi/710 days development Harborecreek pool North East field	149 Mcf AF 800 psi/710 days development Harborecreek pool North East field	149 Mcf AF 698 psi/710 days development Burgess pool North East field	1,300 Mcf AF 860 psi/710 days development Burgess pool North East field

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20766	Erie 20780	Erie 20784	Erie 20788	Erie 20791	Erie 20801	Erie 20802	Erie 20804	Erie 20813	Erie 20814
NAME OF WELL	Lloyd Bashaw #1	Pastore, Inc. #1	Envirogas, Inc.	Harborcreek	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G
OPERATOR	Envirogas, Inc.	C & C Troyer Brothers	Envirogas, Inc.	Harborcreek	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G
TOWNSHIP	North East	Union	Union	Union	Union City E 76 **Union City G	Union City E 76 **Union City G	Union City E 76 **Union City G	Union City E 76 **Union City G	Union City E 76 **Union City G	Union City E 76 **Union City G	Union City E 76 **Union City G
QUAD/ANGLE & MAP NUMBER	North East 8 236 **North East 0	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G	North East 0 243 **Harborcreek G
LATITUDE	11,650 ft. S 42°12'30"	9,550 ft. S 41°55'00"	300 ft. S 42°10'00"	11,400 ft. S 41°55'00"	10,400 ft. S 41°55'00"	7,850 ft. S 42°10'00"	7,900 ft. S 42°10'00"	7,700 ft. S 42°10'00"	7,900 ft. S 42°10'00"	8,090 ft. S 41°57'30"	3,150 ft. S 41°57'30"
LONGITUDE	6,850 ft. W 79°50'00"	11,100 ft. W 79°50'00"	9,400 ft. W 79°50'00"	11,150 ft. W 79°50'00"	9,700 ft. W 79°50'00"	7,300 ft. W 79°52'30"	4,500 ft. W 79°52'30"	4,500 ft. W 79°52'30"	1,950 ft. W 79°52'30"	9,250 ft. W 79°40'00"	9,110 ft. W 79°40'00"
DATE COMPLETED	10-12-79	5-24-79	5-21-79	5-21-79	5-7-79	12-14-79	2-25-80	2-25-80	9-3-79	7-16-79	8-22-79
ELEVATION	1083 GR	1299 OF	650 GR	1344 OF	1334 OF	1261 GR	1323 GR	1323 GR	1390 OF	1733 OF	1789 OF
TULLY	1618-	2523-	1129-		2572-	1833-	1901-	1901-	1987-		
ONONDAGA	1859-	2758-	1340-	2738-	2813-	2054-	2130-	2130-	2213-	*3237-	3236-
CHERT	Bois Blanc @ 2039					Bois Blanc @ 2253	Bois Blanc @ 2326	Bois Blanc @ 2409			
ORISKANY						2310-		2450-		Absent	Absent
HELDERBERG											
KEYSER-BASS ISLAND	2040-		1574-			2318-	2382-	2466-	2466-	3436-	3454-
SALINA	2190-		1712-			2424-	2492-	2578-	2578-	3490-	3510-
GUELPH-LOCKPORT	2543-		2069-			2785-	2856-	2936-	2936-	4140-	4066-
BLACK WATER											
CLINTON	2808-		2341-			3044-	3112-	3193-	3193-	4316-	4336-
IRONDEQUOIT	2859-		2381-			3095-	3168-	3247-	3247-	4370-	4390-
MEDINA	2893-		2418-			3121-	3194-	3272-	3272-	4395-	4412-
WHIRLPOOL	Gas @ 2915-3050 3036-	Gas @ 4034-4148 4140-	Gas @ 2423-2567 2550-	Gas @ 3987-4126 4116-	Gas @ 4025-4188 4182-	Gas @ 3143-3284 3268-	Gas @ 3204-3362 3343-	Gas @ 3306-3441 3428-	Gas @ 4506-4577 4564-	Gas @ 4506-4577 4564-	Gas @ 4506-4577 4564-
QUEENSTON	3052-		2572-			3288-	3365-	3444-	3444-	4579-	4596-
TOTAL DEPTH	3132	4168	2654	4200	4232	3379	3454	3525	3525	4625	4649
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	2,100 Mcf AF 730 psi/10 days development Burgess pool North East field	3,000 Mcf AF 1,220 psi/7 days development New Ireland field	2 Bopd AF 500 Mcf AF 750 psi/10 days extension Harborcreek pool North East field	500 Mcf AF 1,220 psi/7 days development New Ireland field	500 Mcf AF 1,220 psi/10 days development New Ireland field	147 Mcf AF 925 psi/10 days development North East field	92 Mcf AF 910 psi/10 days development Burgess pool North East field	92 Mcf AF 910 psi/10 days development Burgess pool North East field	1,100 Mcf AF 960 psi/10 days development Harborcreek pool North East field	300 Mcf AF 1,050 psi/72 hrs development Corry field	510 Mcf AF 1,000 psi/72 hrs development Spencer Creek pool Corry field

COUNTY	Permit Number	Erie 20815	Erie 20817	Erie 20820	Erie 20821	Erie 20825	Erie 20826	Erie 20835	Erie 20836	Erie 20838	Erie 20839
NAME OF WELL	Herney Bemink #1	James Merry #1	Clifford & Luella Haynes #1	Ronald J. Finch #1	Jennie Banks Tract 2036 #1	Charles Kennedy #2	Marian Lopus #1	James H. Salmon #1	Union FreeWill Baptist Church #1	R & R Parknow #2	
OPERATOR	Appalachian Energy, Inc. AE-48	Appalachian Energy, Inc. AE-54	JAB Enterprises, Inc., Agent	JAB Enterprises, Inc., Agent	Appalachian Energy, Inc. AE-52	Appalachian Energy, Inc. AE-100	Union Drilling #651-PC	C & C Troyer Brothers	Envirogas, Inc.	Taurus Oil Company	
TOWNSHIP	Wayne	Wayne	Waterford	Waterford	Wayne	Wayne	Waterford	Waterford	Greenfield	Conneaut	
QUADRANGLE & MAP NUMBER	Corry B 48 **Columbus A	Corry A 49 **Corry E	Cambidge Spgs. C 46 **Camb. Spgs. NE C	Union City A 67 **Waterford A	Corry A 55 **Corry B	Corry B 56 **Corry C	Union City A 66 **Waterford E	Union City A 46 **Waterford D	North East E 266 **North East G	Girard D 480 **Beaver Center B	
LATITUDE	960 ft. S 42°00'00"	8,250 ft. S 41°57'30"	8,750 ft. S 42°00'00"	8,800 ft. S 42°00'00"	13,590 ft. S 42°00'00"	12,000 ft. S 42°00'00"	6,100 ft. S 41°57'30"	13,050 ft. S 41°57'30"	13,250 ft. S 42°10'00"	3,250 ft. S 41°52'30"	
LONGITUDE	9,850 ft. W 79°35'00"	11,850 ft. W 79°37'30"	1,800 ft. W 80°00'00"	11,050 ft. W 79°57'30"	5,460 ft. W 79°40'00"	4,960 ft. W 79°37'30"	5,000 ft. W 79°55'00"	6,850 ft. W 79°57'30"	10,950 ft. W 79°50'00"	3,750 ft. S 80°25'00"	
DATE COMPLETED	8-1-79	8-16-79	7-8-79	7-19-79	8-27-79	9-3-79	9-7-79	8-1-79	2-18-80	8-23-79	
ELEVATION	1440 OF	1488 OF	1360 GR	1294 DF	1788 DF	1523 DF	1420 KB	1194 DF	1510 DF	899 DF	
TULLY	*2548-	*2776-	2190-	2090-	*2951-	*2690-	2628-	2236-	2148-		
ONONDAGA	2810-	3033-	2420-	2315-	3204-	2950-	2628-	2448-	2375-		
CHERT											
ORISKANY		3228?			3407-	3156-					
HELDERBERG					3432-						
KEYSER-BASS ISLAND	3020-	3244-	2640-	2515-	3440-	3180-					
SILINA	3084-	3286-	2790-	2665-	3478-	3253-					
GUELPH-LOCKPORT	3650-	3996-	3267-	3195-	3983-	3864-			3100-		
BLACK WATER											
CINTON	3900-	4120-	3490-	3430-	4308-	4050-					
IRONDEQUOIT	3970-	4176-	3620-	3537-	4368-	4112-	3822-	3688-	3416-	3168-	
MEDINA	3992-	4202-	3641-	3549-	4393-	4135-	3892-	3718-	3440-	3193-	
WHIRLPOOL	Gas @ 4097-4175 4160-	Gas @ 4286-4314 4368-	Gas @ 3680-3824 3810-	Gas @ 3597-3734 3718-	Gas @ 4563-4578 4558-	Gas @ 4247-4323 4314-	Gas @ 3934-3956 4016- Gas @ 4022	Gas @ 3760-3798 3838-	Gas @ 3464-3604 3587-	Gas @ 3227-3268 3360-	
QUEENSTON	4178-	4384-	3830-	3738-	4550-	4326-	4026-	3850-	3608-	3374-	
TOTAL DEPTH	4250	4454	3898	3403	4620	4406	3896	3898	3687	3408	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	365 Mcf AF 1,100 psi/72 hrs development Brokenstraw field	450 Mcf AF 850 psi/72 hrs development Spencer Creek pool Corry field	222 Mcf AF 990 psi/72 hrs development Talcott pool Erie field	400 Mcf AF 980 psi/72 hrs new pool discovery Talcott pool Erie field	450 Mcf AF 1,200 psi/72 hrs development Spencer Creek pool Corry field	400 Mcf AF 1,200 psi/72 hrs development Brokenstraw field	400 Mcf AF 1,200 psi/72 hrs development Brokenstraw field	1,700 Mcf AF 1,210 psi/72 days extension Waterford pool LeBoeuf field	551 Mcf AF 975 psi/10 days development Hornby pool North East field	400 Mcf AF 1,050 psi/48 hrs development Bushman-Lexington pool Conneaut field	

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20840	Erie 20841	Erie 20842	Erie 20843	Erie 20844	Erie 20845	Erie 20850	Erie 20852	Erie 20854	Erie 20855
NAME OF WELL	Lawrence Sekula #1	Mutual Oil & Gas Company M 2-P	Walter Kostenski #1	Calvin Henry #2	Wallace McCall #1	MITan L. Pavkov #1	Robert H. Tracy #1	Thomas G. & Geraldine McGuire #1	Orto Watrous Tract 2066 #1	Merle Willey #1	Thomas J. Post #1
OPERATOR	Mutual Oil & Gas Company M 2-P	Mutual Oil & Gas Company M 1-P	Mutual Oil & Gas Company M 1-P	Envirogas, Inc.	Robert H. Brace	Mutual Oil & Gas Company M 3-P	Mutual Oil & Gas Company M 4-P	Union Drilling #650-PC	Appalachian Energy, Inc. AE-58	Union Drilling #640-PC	Union Drilling #645-PC
TOWNSHIP	McKean	McKean	McKean	Venango	Waterford	McKean	McKean	Waterford	Wayne	Waterford	Waterford
QUADRANGLE & MAP NUMBER	Cambdge Spgs C 53 **Camb Spgs NE E	Cambdge Spgs B 54 **Camb Spgs NE A	North East E 237 **Hammett C	Union City A 90 **Waterford 0	Cambdge Spgs 8 55 **Camb Spgs NE O	Cambdge Spgs B 56 **Camb Spgs NE A	Union City A 68 **Waterford E	Union City A 69 **Waterford E	Union City A 70 **Waterford E	Union City A 69 **Waterford E	Union City A 70 **Waterford E
LATITUDE	2,400 ft. S 41°57'30"	14,350 ft. S 42°00'00"	14,450 ft. S 42°07'30"	11,500 ft. S 41°57'30"	1,050 ft. S 41°57'30"	14,000 ft. S 42°00'00"	9,950 ft. S 41°57'30"	7,200 ft. S 42°00'00"	12,650 ft. S 41°57'30"	12,800 ft. S 41°57'30"	12,800 ft. S 41°57'30"
LONGITUDE	11,250 ft. W 80°02'30"	650 ft. W 80°05'00"	2,600 ft. W 79°52'30"	7,750 ft. W 79°57'30"	10,550 ft. W 80°05'00"	9,550 ft. W 80°05'00"	6,550 ft. W 79°55'00"	7,800 ft. W 79°37'30"	2,900 ft. W 79°55'00"	5,300 ft. W 79°55'00"	5,300 ft. W 79°55'00"
DATE COMPLETED	9-16-79	10-14-79	8-25-79	9-18-79	9-21-79	10-20-79	10-8-79	9-3-79	8-26-79	9-28-79	9-28-79
ELEVATION	1495 KB	1534 KB	1485 GR	1184 OF	1445 KB	1385 GR	1352 KB	1769 DF	1305 KB	1227 KB	1227 KB
TULLY	*2416-	*2424-	2222-	2350-	*2256-	2346-	2576-	2564-	2262-	2492-	2492-
ONONDAGA	2630-	2638-	2654-	2428-	2564-	2466-	2576-	2564-	2564-	2564-	2564-
CHERT			Bois Blanc @ 2642-2692								
ORISKANY		2916-	Absent				2750-				2670-
HELDERBERG		2953-	Absent								
KEYSER-BASS ISLAND		2984-	2692-				2805-				2724-
SALINA		3030-	2801-				2896-				2811-
GUELPH-LOCKPORT	3462-	3449-	3173-				3407-				3320-
BLACK WATER											
CLINTON	3738-	3728-	3427-				3579-				
IRONDEQUOIT	3796-	3793-	3483-				3636-				3681-
MEDINA	3818-	3816-	3506-				3658-				3712-
WHIRLPOOL	Gas @ 3854-3908 3976-	Gas @ 3857-3931 3988-	Gas @ 3532-3681 3665-	Gas @ 3740-3785 3862-	Gas @ 3773-3827 3904-	Gas @ 3595-3747 3832-	Gas @ 3838-3880 3964-	*4338- Gas @ 4388-4499 4492-	3822- Gas @ 3822-3886 3951-	3822- Gas @ 3745-3870 3876-	Gas - Gas 3887-
QUEENSTON	3983-	3994-	3687-				3840-				3990
TOTAL DEPTH	4112	4017	3783	3914	3988	3858	4063	4562	4150	3990	3990
OEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	24,592 cf Nat. 835 Mcf AF 1,120 psi/48 hrs development Reeds Corners field	133 Mcf Nat. 635 Mcf AF 920 psi/48 hrs development Reeds Corners field	1,400 Mcf AF 952 psi/10 days extension Hornby pool North East field	400 Mcf AF 1,100 psi/7 days development Waterford pool Leboeur field	12,386 cf Nat. 1,175 Mcf AF 1,125 psi/48 hrs development Reeds Corners field	876 Mcf Nat. AF open flow not given 1,000 psi/48 hrs development Reeds Corners field	550 Mcf AF 1,125 psi/48 hrs development Waterford pool Leboeur field	500 Mcf AF 1,200 psi/72 hrs development Brokenstraw field	550 Mcf AF 1,170 psi/48 hrs development Waterford pool Leboeur field	267 Mcf AF 950 psi/48 hrs development Waterford pool Leboeur field	267 Mcf AF 950 psi/48 hrs development Waterford pool Leboeur field

SUMMARIZED RECORDS OF DEEP WELLS

COUNTY	Permit Number	Erie 20862	Erie 20865	Erie 20866	Erie 20867	Erie 20868	Erie 20875	Erie 20876	Erie 20877	Erie 20879	Erie 20880
NAME OF WELL	Herbert Norton #1	Peter Swanson #1	M. R. & J. B. Hemstreet #1	Vineyard Oil & Gas Company	Rodney Watrous #2	John Brewer #1	Lloyd Bashaw #2	Frank & Josephine Catichino #1	Ladd Farm #2	John & Calvin Still #1	
OPERATOR	Appalachian Energy, Inc. AE-125	Envirogas, Inc.	Northwest Natural Gas Company	Greenfield	Wayne	Envirogas, Inc. AE-102	Envirogas, Inc.	Northwest Natural Gas Company	C & C Troyer Brothers	C & C Troyer Brothers	
TOWNSHIP	Concord	Greenfield	Conneaut	North East	Wayne	Greenfield	North East	Conneaut	Wayne	Wayne	
QUADRANGLE & MAP NUMBER	Corry D 58 **Corry H	North East E 258 **Harborcreek I	Girard E 494 **Conneautville A	North East C 251 **North East B	Corry B 59 **Corry C	North East E 267 **Harborcreek I	North East B 238 **North East D	Girard E 495 **Conneautville A	Union City G 78 **Union City F	Union City C 79 **Union City F	
LOCATION	11,160 ft. S 41°55'00"	11,800 ft. S 42°10'00"	5,350 ft. S 41°52'30"	8,150 ft. S 42°15'00"	7,650 ft. S 42°00'00"	14,600 ft. S 42°10'00"	13,250 ft. S 41°12'30"	5,700 ft. S 41°52'30"	2,500 ft. S 41°57'30"	5,150 ft. S 41°57'30"	
LONGITUDE	4,950 ft. W 79°40'00"	750 ft. W 79°52'30"	5,550 ft. W 80°10'00"	8,250 ft. W 79°47'30"	5,200 ft. W 79°37'30"	500 ft. W 79°52'30"	6,600 ft. W 79°50'00"	7,100 ft. W 80°10'00"	150 ft. W 79°45'00"	300 ft. W 79°45'00"	
DISTANCE COMPLETED	10-2-79	9-25-79	10-2-79	11-9-79	9-24-79	2-9-80	10-3-79	10-5-79	10-12-79	12-11-79	
ELEVATION	1718 DF	1490 GR	1184 OF	758 OF	1621 OF	1490 OF	1200 GR	1089 OF	1479 OF	1474 OF	
TULLY	2110-	2042-	2042-	1175-	*2760-	2121-	1727-	2055-	2864-	2672-	
ONONDAGA	2332-	2220-	2220-	1330-	3019-	2350-	1954-	2230-	3008-	2908-	
CHERT	Bois Blanc @ 2535				Absent		Bois Blanc @ 2153				
CRISKANY											
HELDERBERG					3223-						
KEYSER-BASS ISLAND		2590-	2404-	1690-	3250-	2201-	2201-	2418-			
SALINA		2692-	2480-	1797-	3293-	2303-	2303-	2495-			
GUELPH-LOCKPORT		3064-	3059-	2190-	3879-	3079-	2660-	3070-			
BLACK WATER											
CLINTON	**4497-	3311-	3310-	2253-	4125-	2924-	2924-	3412-			
IRONDEQUOIT	4538-	3371-	3402-	2415-	4193-	3394-	2974-	3412-	4150-	4050-	
NEEDHAM	4561-	3401-	3428-	2435-	4216-	3420-	3010-	3438-	4180-	4076-	
WHIRLPOOL	Gas @ 4582-4760 4734-	Gas @ 3424-3566 3548-	Gas @ 3492-3602 3588-	Gas @ 2446-2568 2558-	Gas @ 4301-4393 4386-	Gas @ 3448-3588 3570-	Gas @ 3026-3167 3153-	Gas @ 4228-4296 4350-	Gas @ 4146-4186 4246-		
QUEENSTON	4753-	3568-	3610-	2572-	4402-	3590-	3169-	3619-	4363-	4268-	
TOTAL DEPTH	4798	3666	3673	2640	4453	3687	3248	3700	4438	4405	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	
RESULT	500 Mcf AF 1,200 psi/72 hrs deeper pool test Harbor Ridge pool Concord field	149 Mcf AF 910 psi/10 days development Burgess pool North East field	1,100 Mcf AF 995 psi/28 hrs development Lundys Lane pool Conneaut field	1,103 Mcf AF 758 psi/3 days development Orchard Beach pool North East field	400 Mcf AF 1,200 psi/72 hrs development Brokenstraw field	958 Mcf AF 950 psi/10 days development Hornby pool North East field	958 Mcf AF 950 psi/10 days development Hornby pool North East field	212 Mcf AF 770 psi/10 days development Burgess pool North East field	1,900 Mcf AF 1,020 psi/28 days development Lundys Lane pool Conneaut field	2,000 Mcf AF 1,180 psi/3 days development Corry field	2,500 Mcf AF 1,200 psi/7 days development Corry field

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20883	Erie 20884	Erie 20885	Erie 20886	Erie 20887	Erie 20898	Erie 20890	Erie 20891	Erie 20892	Erie 20893
NAME OF WELL		Florence L. Hellyer #1	Hazel C. Kline #1	Helen Stafford #1	Thomas J. Wilrich #1	Myrl Sturtz & E. K. Waters #1	Ladd Farm #3	Guenther Martins #1	Hora Morse #1	Joe & Chester Zombeck #1	Robert & Betty Shreve #1
OPERATOR		Northwest Natural Gas Company	Meridian Exploration Corporation	Meridian Exploration Corporation	Meridian Exploration Corporation	Northwest Natural Gas Company	C & C Troyer Brothers	Vineyard Oil & Gas Company	Envirogas, Inc.	Union Drilling #0670	Union Drilling #0670
TOWNSHIP		Conneaut	Washington	Washington	Washington	Conneaut	Wayne	Waterford	North East	Union	Union
QUADRANGLE & MAP NUMBER		Girard E 496 **Conneautville A	Cambodge Spgs F 43 **Cambodge Spgs B	Cambodge Spgs F 44 **Cambodge Spgs NE H	Cambodge Spgs F 45 **Cambodge Spgs NE H	Girard E 497 **Conneautville A	Corry A 67 **Corry A	Union City A 60 **Waterford D	North East C 280 **North East E	Union City E 80 **Union City G	Union City E 81 **Union City G
LATITUDE		9,050 ft. S 41°52'30"	5,900 ft. S 41°52'30"	9,350 ft. S 41°55'00"	2,300 ft. S 41°55'00"	4,600 ft. S 41°52'30"	13,600 ft. S 42°00'00"	9,950 ft. S 41°57'30"	11,600 ft. S 42°12'30"	11,150 ft. S 41°55'00"	12,550 ft. S 41°55'00"
LONGITUDE		9,800 ft. W 80°20'00"	2,850 ft. W 80°02'30"	2,750 ft. W 80°02'30"	8,750 ft. W 80°02'30"	10,550 ft. W 80°10'00"	10,050 ft. W 79°42'30"	1,750 ft. W 79°57'30"	4,100 ft. W 79°47'30"	10,000 ft. W 79°50'00"	8,500 ft. W 79°50'00"
DATE COMPLETED		11-7-79	11-7-79	1-18-80	1-9-80	10-23-79	10-29-79	10-23-79	6-22-80	10-27-79	11-2-79
ELEVATION		1079 DF	1260 XB	1230 XB	1278 KB	1029 DF	1649 DF	1200 GR	1320 DF	1361 KB	1381 KB
TULLY		2056-	*2441-	*2322-	*2323-	1976-	2704-	2103-	1838-	2607-	2636-
ONONDAGA	LIMESTONE	2229-	2658-	2540-	2536-	2148-	2940-	2329-	2068-	2846-	2871-
CHERT											
OHISKANY			2307-	Absent	2800-					3014-	3043-
HELDERBERG			2914-	Absent	Absent						
KEYSER-BASS ISLAND		2492-	2970-	2811-	2809-	2502-	2581-	2581-	3074-	3096-	3096-
SALINA		2562-	3005-	2876-	2866-	2560-	2697-	2697-	3157-	3166-	3166-
GUELPH-LOCKPORT		3124-	3542-	3408-	3378-	3003-	3213-	3213-	2795-	3666-	3698-
BLACK WATER											
CANTON		3312-	3814-	3654-	3643-	3272-	3421-	3421-		4024-	4059-
IRONDEQUOIT		3416-	3866-	3734-	3701-	3342-	3540-	3540-		4035-	4089-
MEDINA		3450-	3891-	3757-	3725-	3370-	3565-	3565-	3139-	4035-	4089-
WHIRLPOOL		Gas @ 3497-3535	Gas @ 3928-4076	Gas @ 3801-3938	Gas @ 3776-3904	Gas @ 3423-3449	Gas @ 4186-4226	Gas @ 3639-3691	Gas @ 3147-3301	Gas @ 4099-4224	Gas @ 4177-4269
		3618-	4069-	3930-	3900-	3544-	4214-	3735-	3288-	4218-	4257-
QUEENSTON		3625-	4078-	3940-	3906-	3548-	4228-	3745-	3306-	4232-	4274-
TOTAL DEPTH		3743	4182	4182	4085	3690	4288	3838	3390	4338	4367
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		1,400 Mcf AF 1,010 psi/28 days development Lundys Lane pool Conneaut field	441 Mcf AF 1,250 psi/7 days extension Edinboro North field	861 Mcf AF 1,200 psi/14 days new field discovery Edinboro North field	2,000 Mcf AF 1,220 psi/15 days extension Edinboro North field	1,100 Mcf AF 990 psi/28 days development Lundys Lane pool Conneaut field	212 Mcf AF 1,045 psi/4 days development Waterford pool LeBoeuf field	212 Mcf AF 1,045 psi/4 days development Corry field	212 Mcf AF 980 psi/10 days development Orchard Beach pool North East field	267 Mcf AF 1,050 psi/48 hrs development New Ireland field	327 Mcf AF 860 psi/48 hrs development New Ireland field

SUMMARIZED RECORDS OF DEEP WELLS

85

COUNTY	Permit Number	Erie 20894	Erie 20896	Erie 20902	Erie 20903	Erie 20906	Erie 20911	Erie 20912	Erie 20913	Erie 20914
NAME OF WELL	Frank S. Puckley #1	John & Robert Sill #2	Frank & Patricia Pollock #1	Carlton & Phylliss Pattison #1	James Schultz #1	Norman Bartlett #1	Joseph Kloss #1	Wayne Seymour #1	Pamula Kloszewski #1	Thomas Graczyk Tract 114 #1
OPERATOR	C & C Troyer Brothers	C & C Troyer Brothers	Union Drilling #0668	Union Drilling #0666	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.
TOWNSHIP	Wayne	Wayne	Union	Union	North East	Greenfield	Greenfield	Greenfield	North East	Greenfield
QUADRANGLE & MAP NUMBER	Corry A 68 **Corry B	Corry A 69 **Corry D	Union City F 82 **Union City H	Union City F 83 **Union City H	North East 8 271 **North East D	North East E 244 **Harborscreek I	North East E 239 **North East G	North East E 240 **Harborscreek I	North East B 259 **North East I	North East E 263 **Hammitt C
LATITUDE	11,750 ft. S 42°00'00"	4,100 ft. S 41°57'30"	15,050 ft. S 41°55'00"	11,350 ft. S 41°55'00"	12,900 ft. S 42°12'30"	5,000 ft. S 42°10'00"	9,800 ft. S 42°10'00"	6,550 ft. S 42°10'00"	14,000 ft. S 42°12'30"	5,750 ft. S 42°07'30"
LONGITUDE	8,700 ft. W 79°40'00"	4,400 ft. W 79°42'30"	4,750 ft. W 79°47'30"	8,900 ft. W 79°47'30"	10,200 ft. W 79°50'00"	1,850 ft. W 79°52'30"	9,100 ft. W 79°50'00"	3,150 ft. W 79°52'30"	1,400 ft. W 79°50'00"	4,450 ft. W 79°52'30"
DATE COMPLETED	11-9-79	11-5-79	11-15-79	11-9-79	6-12-80	11-8-79	11-25-79	11-16-79	1-20-80	3-5-80
ELEVATION	1849 DF	1674 KB	1430 GR	1391 KB	1045 GR	1315 GR	1455 GR	1340 GR	1325 GR	1445 GR
TULLY		2702-	2749-	2670-	1578-	1889-	2070-	1889-	1867-	2116-
ONONDAGA LIMESTONE	3220-	2931-	3043-	2914-	1800-	2116-	2296-	2142-	2092-	2341-
CHERT					Bois Blanc @ 2000	Bois Blanc @ 2312	Bois Blanc @ 2490	Bois Blanc @ 2339	Bois Blanc @ 2294	Bois Blanc @ 2531
ORISKANY			3234-	3077-	Absent	Absent	2548-	Absent	Absent	2591-
HELOERBERG							Absent	Absent	Absent	Absent
KEYSER-BASS ISLAND			3298-	3120-	2050-	2353-	2552-	2382-	2349-	2501-
SALINA			3360-	3178-	2152-	2474-	2657-	2497-	2450-	2715-
GUELPH-LOCKPORT			3636-	3725-	2508-	2832-	3024-	2861-	2809-	3083-
BLACK WATER										
CLINTON	4382-	4050-	4200-	4106-	2777-	3086-	3293-	3118-	3070-	3346-
IRONDEQUOIT			4231-	4136-	2821-	3141-	3336-	3172-	3124-	3395-
MEADINA	4410-	4072-	Gas @ 4294-4410	Gas @ 4172-4285	2806-	3169-	3362-	3196-	3148-	3419-
WHIRLPOOL	4574-	4250-	4400-	4306-	Gas @ 2968-3070	Gas @ 3192-3335	Gas @ 3306-3530	Gas @ 3250-3364	Gas @ 3157-3314	Gas @ 3444-3585
QUEENSTON	4568-	4290-	4414-	4322-	2594-	3320-	3516-	3296-	3297-	3570-
TOTAL DEPTH	4690	4530	4530	4424	3115	3427	3606	3452	3383	3693
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	500 Mcf AF 1,100 psi/5 days development Spencer Creek pool Corry field	Plugged and abandoned extension Beaver Dam pool Corry field	335 Mcf AF 1,000 psi/48 hrs extension Pattison pool New Ireland field	712 Mcf AF 1,250 psi/48 hrs extension Pattison pool New Ireland field	1,300 Mcf AF 665 psi/10 days development Burgess pool North East field	1,200 Mcf AF 970 psi/10 days development Burgess pool North East field	1,300 Mcf AF 1,000 psi/10 days development Burgess pool North East field	1,300 Mcf AF 985 psi/10 days development Burgess pool North East field	2,100 Mcf AF 840 psi/10 days development Burgess pool North East field	4,700 Mcf AF 1,120 psi/10 day development Hobby pool North East field

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20915	Erie 20928	Erie 20930	Erie 20931	Erie 20934	Erie 20939	Erie 20941	Erie 20943	Erie 20944	Erie 20945
NAME OF WELL	Thomas N. Tipping #1	Lawrence Brumagin #1	Baldwin #1-2	Baldwin #1-3	G. & V. Neal #1	M. & M. Tozer #1	Guenther Martens #2	Gerald Sprinks #1	Julia Wasielewski #1	Nora Morse #2	
OPERATOR	Adobe Oil & Gas Corporation	Envirogas, Inc.	Oilmark & Company Inc.	Oilmark & Company Inc.	Goe Pro, Inc.	Goe Pro, Inc.	Vineyard Oil & Gas Company	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	
TOWNSHIP	Wayne	Vanango	Millcreek	Millcreek	Elk Creek	Elk Creek	Waterford	Summit	North East	North East	
QUADRANGLE	MAP NUMBER	North East I 260	Erie 0 143	Erie 0 144	Girard F 513	Girard F 514	Union City A 71	North East E 281	Erie J 147	North East C 298	
		**Corry C	**Sawville B	**Sawville B	**Conneautville B	**Conneautville B	**Waterford 0	**Hammett C	**Erie South H	**North East E	
LATITUDE	4,000 ft. S 42°00'00"	14,650 ft. S 42°05'00"	11,550 ft. S 42°07'30"	10,800 ft. S 42°07'30"	6,300 ft. S 41°52'30"	7,650 ft. S 41°52'30"	9,750 ft. S 41°57'30"	14,550 ft. S 42°07'30"	8,800 ft. S 42°02'30"	11,500 ft. S 42°12'30"	
LONGITUDE	7,750 ft. W 79°37'30"	7,400 ft. W 79°47'30"	6,000 ft. W 80°10'00"	4,500 ft. W 80°10'00"	5,200 ft. W 80°17'30"	4,300 ft. W 80°17'30"	3,450 ft. W 79°57'30"	1,000 ft. W 79°52'30"	6,700 ft. W 80°02'30"	2,150 ft. W 79°47'30"	
OATE COMPLETED	1-21-80	1-11-80	2-6-80	2-10-80	3-1-80	2-8-80	1-29-80	6-30-80	1-19-80	8-12-80	
ELEVATION	1762 KB	1420 GR	654 OF	664 OF	1144 OF	1084 OF	1226 OF	1545 OF	1450 OF	1319 OF	
TULLY	2845-	2291-					2082-	2293-	2117-	1855-	
ONONDAGA	3097-	2522-	1416-	1416-	2280-	2251-	2308-	2524-	2340-	2036-	
CHERT		Bois Blanc @ 2706									
ORISKANY					2528-	2502-					
HELDERBERG											
KEYSER-BASS ISLAND	3298-	2744-									
SALINA	3641-	2855-			2870-	2844-					
GUELPH-LOCKPORT	3886-	3303-			3130-	3126-			3185-	2808-	
BLACK WATER											
CLINTON	4099-	3552-									
IRONDEQUOIT		3615-	2490-	2490-	3462-	3462-	3540-			3078-	
MEDINA	4187-	3642-	2529-	2526-	3495-	3495-	3572-	3575-	3522-	3128-	
WHIRLPOOL	4456-	3798-	2675-	2674-	3662-	3662-	3732-	Gas @ 3543-3692 3731-	Gas @ 3543-3692 3687-	3154-	
QUEENSTON	4463-	3815-	2686-	2684-	3676-	3676-	3746-	3746-	3698-	3319-	
TOTAL DEPTH	4573	3909	2741	2755	3680	3651	3608	3823	3797	3417	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Cabot Head	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	Plugged and abandoned Brokenstraw field	2,300 Mcf AF 1,160 psi/10 days new pool discovery Bailey Brook pool North East field	95 Mcf AF 900 psi/24 hrs development Charter Oaks pool Erie field	1,250 Mcf AF 905 psi/15 min. development Charter Oaks pool Erie field	260 Mcf AF 90 psi/15 min. development Lundys Lane pool Conneaut field	2,400 Mcf AF 290 psi/15 min. development Lundys Lane pool Conneaut field	2,475 Mcf AF 1,170 psi/4 days development Waterford pool LeBoeuf field	302 Mcf AF 985 psi/10 days development Hornby pool North East field	551 Mcf AF 880 psi/10 days new pool discovery Ounn Valley pool Erie field	780 Mcf AF 990 psi/10 days development Orchard Beach North East field	

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Erie 20946	Erie 20947	Erie 20948	Erie 20949	Erie 20950	Erie 20953	Erie 20955	Erie 20960	Erie 20961	Erie 20962
NAME OF WELL		Joseph #1980	Baldwin #1-1	Calvin Henry #1	G. H. McGuire #6225	Richard Nygaard #6226	Leo Spitzman #1	Walter Gulcznski #1	Robert H. Brace #2	Donald Vosten #1	Sidney Wheeler #1
OPERATOR		Benedictine Sisters of Erie, Inc.	Oilmark & Company Inc.	Envirogas, Inc.	National Fuel Gas Supply Corp.	National Fuel Gas Supply Corp.	Appalachian Energy, Inc. AE-130	Envirogas, Inc.	Robert H. Brace	Envirogas, Inc.	Vineyard Oil & Gas Company
TOWNSHIP		Harborcreek	Millcreek	Venango	Greenfield	North East	Concord	Greenfield	Waterford	Greenfield	North East
QUADRANGLE & MAP NUMBER		North East A 272 **Harborcreek D	Erie O 145 **Swarville B	North East H 268 **Hammett F	North East E 273 **North East G	North East E 274 **North East G	Corry E 62 **Corry I	North East E 282 **Hammett C	Union City A 65 **Waterford E	North East E 276 **Hammett C	North East B 269 **Harborcreek C
LATITUDE		10,650 ft. S 42°12'30"	13,400 ft. S 42°07'30"	1,300 ft. S 42°05'00"	5,800 ft. S 42°10'00"	3,680 ft. S 42°10'00"	6,850 ft. S 41°55'00"	13,000 ft. S 42°07'30"	14,250 ft. S 41°57'30"	7,950 ft. S 42°07'30"	14,100 ft. S 42°15'00"
LONGITUDE		3,850 ft. W 79°57'30"	5,650 ft. W 80°10'00"	2,650 ft. W 79°52'30"	6,890 ft. W 79°50'00"	3,950 ft. W 79°50'00"	7,500 ft. W 79°37'30"	1,700 ft. W 79°32'30"	9,400 ft. W 79°55'00"	6,700 ft. W 79°52'30"	250 ft. W 79°52'30"
DATE COMPLETED		1-22-80	1-22-80	1-30-80	2-8-80	3-11-80	3-10-80	6-8-80	2-25-80	3-15-80	5-2-80
ELEVATION		646 OF	704 OF	1455 OF	1382 GR	1345 K8	1573 OF	1535 OF	1244 OF	1370 GR	756 OF
TULLY		1251-		2212-	*1983-	*1930-	*3002-	2254-	2224-	2045-	1251-
ONONDAGA	LIMESTONE	1345-	1468-	2443-	2204-	2156-	3270-	2489-	2450-	2270-	1409-
CHERT				Bois Blanc @ 2629						Bois Blanc @ 2465	
ORISKANY					2381- Gas @ 2382-2402		3456-			2519-	
HELDERBERG											
KEYSER-BASS ISLAND					2427-	2402-	3472-			2528-	
SALINA						2485-	3514-			2650-	
GUELPH-LOCKPORT						2876-		3217-		3016-	2208-
BLACK WATER											
CLINTON					3410-	3075-				3290-	
IRONDEQUOIT		2343-	2540-	3475-		3189-	4408-		3664-	3330-	2429-
MEDINA		2359-	2576-	3499-		3233-	4432-	3548-	3694-	3354-	2448-
WHIRLPOOL	Gas @ 2393-2528	2510-	Gas @ 2608-2735	Gas @ 2508-3662		Gas @ 3268-3379	Gas @ 4607-4620	Gas @ 3558-3716	Gas @ 3734-3816	Gas @ 3383-3522	Gas @ 2453-2588
QUEENSTON		2532-	2739-	3666-		3383-	4626-	3718-	3874-	3525-	2592-
TOTAL DEPTH		2578	2827	3769	2520	3493	4731	3786	3960	3601	2666
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Bass Island	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		484 Mcf AF 775 psi/72 hrs development Harborcreek pool North East field	1,100 Mcf AF 910 psi/24 hrs extension Charter Oaks pool Erie field	149 Mcf AF 960 psi/10 days development North East field	8,347 Mcf AF 778 psi/68 hrs discovery McGuire pool North East field	1,172 Mcf AF 895 psi/4 days development Burgess pool North East field	500 Mcf AF 1,200 psi/72 hrs new pool discovery Stewart Road pool Concord field	49 Mcf AF 1,100 psi/10 days development Hornby pool North East field	2,000 Mcf AF 1,080 psi/2 days development Waterford pool LeBoeuf field	4,100 Mcf AF 1,175 psi/10 days development Hornby pool North East field	431 Mcf AF 750 psi/7 days development Orchard Beach pool North East field

Figure 36. (Continued)

COUNTY	Permit Number	Erie 20963	Erie 20964	Erie 20965	Erie 20970	Erie 20972	Erie 20975	Erie 20978	Erie 20980	Erie 20981	Erie 20982
NAME OF WELL		Walter Rothhoff #1	Lawrence Made #1	David & Felicidad Gutierrez #2	Peter Baker #1	Brice Miller #1-A	Howard Orton #3	Roger Marsh #1	David Wiggers #1	Morris Wickwire #1	Nancy Redmond #1
OPERATOR		Vineyard Oil & Gas Company	Appalachian Energy, Inc. AE-123	Northwest Natural Gas Company	Appalachian Energy, Inc. AE-139	C & C Troyer Brothers	Envirogas, Inc.	Appalachian Energy, Inc. AE-63	Appalachian Energy, Inc. AE-59	Appalachian Energy, Inc. AE-62	Appalachian Energy, Inc. AE-61
TOWNSHIP		Venango	Concord	Elk Creek	Concord	Waterford	North East	Wayne	Wayne	Wayne	Wayne
QUADRANGLE & MAP NUMBER		North East I 299 **Wattsburg H	Concord **Corry G	Elk Creek **Conneautville A	Corry E 63 **Corry I	Union City A 84 **Waterford O	North East C 277 **North East E	Corry A 76 **Corry O	Corry A 64 **Corry B	Corry A 65 **Corry 8	Corry B 71 **Corry F
LATITUDE		10,150 ft. S 42°02'30"	13,710 ft. S 41°55'00"	8,250 ft. S 41°52'30"	9,300 ft. S 41°55'00"	13,000 ft. S 41°57'30"	8,000 ft. S 42°12'30"	9,760 ft. S 41°57'30"	11,300 ft. S 42°00'00"	13,480 ft. S 42°00'00"	250 ft. S 41°57'30"
LONGITUDE		7,900 ft. W 79°47'30"	2,060 ft. W 79°42'30"	1,500 ft. W 80°20'00"	7,400 ft. W 79°37'30"	2,800 ft. W 79°57'30"	10,550 ft. W 79°47'30"	4,720 ft. W 79°42'30"	600 ft. W 79°40'00"	490 ft. W 79°40'00"	7,310 ft. W 79°37'30"
DATE COMPLETED		4-19-80	3-3-80	2-22-80	3-20-80	2-4-80	6-4-80	6-12-80	4-10-80	3-28-80	4-24-80
ELEVATION		1315 GR	1568 OF	1114 DF	1630 K8	1194 OF	1134 OF	1512 GR	1473 K8	1503 K8	1451 OF
TULLY		2226-	*3020-	2070-	*3066-	2114-	1675-		*2590-		*2651-
ONONDAGA	LIMESTONE CHERT	2391-	3274-	2252-	3332-	2352-	1841-		2850-		2904-
ORISKANY					3508-						
HELDERBERG											
KEYSER-BASS ISLAND		2645-	3450-		3525-		2569-		3048-		3105-
SALINA		2759-	3506-		3566-						3164-
GUELPH-LOCKPORT		3275-	4070-	3108-	4142-						
BLACK WATER											
CLINTON		3483-	4346-	3448-	4412-	3584-	2889-		3954-		4060-
IRONDEQUOIT		3595-	4403-	3479-	4470-	3614-	2913-	*4224-	4033-	*4140-	4084-
MEDINA		3630-	4430-	3479-	4495-	3614-	2913-	*4224-	4033-	*4140-	4084-
WHIRLPOOL		Gas @ 3639-3795 3788-	Gas @ 4606-4618 4606-	Gas @ 3516-3578 3565-	Gas @ 4671-4683 4664-	Gas @ 3657-3729 3784-	Gas @ 2919-3073 3060-	Gas @ 4245-4348 4338-	Gas @ 4133-4168 4202-	Gas @ 4220-4242 4286-	Gas @ 4185-4264 4250-
QUEENSTON		3800-	4621-	3668-	4686-	3792-	3076-	4356-	4218-	4309-	4268-
TOTAL DEPTH		3868	4642	3747	4752	3638	3175	4420	4302	4385	4362
DEEPEST FORMATION REACHED		Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		IP not reported 790 psi/48 hrs new pool discovery Wattsburg pool North East field	500 Mcf AF 1,000 psi/72 hrs extension Harbor Ridge pool Concord field	2,000 Mcf AF 1,020 psi/28 days development Lundys Lane pool Conneaut field	415 Mcf AF 975 psi/72 hrs development Stewart Road pool Concord field	3,500 Mcf AF 1,180 psi/72 days development Waterford pool Leboeuf field	449 Mcf AF 840 psi/10 days development Orchard Beach pool North East field	300 Mcf AF 1,100 psi/72 hrs extension Beaver Dam pool Corry field	925 Mcf AF 1,000 psi/72 hrs development Spencer Creek pool Corry field	850 Mcf AF 1,050 psi/72 hrs development Spencer Creek pool Corry field	330 Mcf AF 1,050 psi/72 hrs development Brokenstraw Field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Erie 20983	Erie 21000	Erie 21003	Erie 21004	Erie 21005	Erie 21007	Erie 21008	Erie 21009	Erie 21010	Erie 21011
NAME OF WELL	Pauline McIntyre #1	Jan Howard #1	Paul Sutton #1	Bernice Stoddard #1	Kenneth Loveland #1	Francis Ross #1	R. K. Farver #1	Archie Bishop #1	Bernard Wilson #1	Robert Mitchell #1	
OPERATOR	Appalachian Energy, Inc. AE-89	Appalachian Energy, Inc. AE-152	Appalachian Energy, Inc. AE-115	Appalachian Energy, Inc. AE-87	Appalachian Energy, Inc. AE-151	Appalachian Energy, Inc. AE-153	Appalachian Energy, Inc. AE-56	Appalachian Energy, Inc. AE-66	Appalachian Energy, Inc. AE-81	Envirogas, Inc.	
TOWNSHIP	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne	Wayne	Greene
QUADRANGLE & MAP NUMBER	Corry B 75 **Corry C	Corry B 72 **Corry C	Corry B 73 **Corry F	Corry B 74 **Corry F	Corry B 77 **Corry C	Corry B 83 **Corry C	Corry A 78 **Corry E	Corry A 79 **Corry O	Corry A 82 **Corry O	North East D 278 **Blamett B	
LATITUDE	10,360 ft. S 42°00'00"	9,500 ft. S 42°00'00"	5,300 ft. S 41°57'30"	2,590 ft. S 41°57'30"	14,210 ft. S 42°00'00"	9,250 ft. S 42°00'00"	4,990 ft. S 41°57'30"	7,450 ft. S 41°57'30"	12,310 ft. S 41°57'30"	9,950 ft. S 42°07'30"	
LONGITUDE	9,800 ft. W 79°37'30"	11,250 ft. W 79°37'30"	1,970 ft. W 79°37'30"	1,100 ft. W 79°37'30"	3,450 ft. W 79°37'30"	8,200 ft. W 79°37'30"	7,590 ft. W 79°40'00"	5,550 ft. W 79°42'30"	900 ft. W 79°42'30"	10,750 ft. W 79°55'00"	
DATE COMPLETED	5-22-80	5-8-80	5-22-80	5-27-80	6-5-80	8-7-80	6-25-80	6-18-80	7-19-80	5-29-80	
ELEVATION	1569 OF	1471 OF	1468 OF	1643 KB	1481 OF	1673 OF	1766 OF	1666 OF	1580 GR	1390 OF	
TULLY	*2690-	*2584-	*2750-	*2911-	*2702-			*2872-		2026-	
ONONDAGA	2944-	2838-	3010-	3177-	2958-			3115-		2256-	
CHERT											
ORISKANY	3146-	3038-	3205-	3375-	3160-			3334-			
HELDERBERG		3070-									
KEYSER-BASS ISLAND	3156-	3078-	3221-	3378-	3173-			3344-			
SALINA	3218-	3110-	3266-	3430-	3216-			3387-			
GUELPH-LOCKPORT	3795-	3626-									3015-
BLACK WATER											
CLINTON	4052-	3946-									
IRONDEQUOIT	4112-	4012-	4149-	4295-	4100-						3331-
MEDINA	4137-	4035-	4172-	4319-	4125-	4330-	4394-	4288-	4316-	3354-	
WHIRLPOOL	Gas @ 4243-4319	Gas @ 4117-4213	Gas @ 4258-4357	Gas @ 4427-4503	Gas @ 4187-4307	Gas @ 4422-4493	Gas @ 4485-4575	Gas @ 4457-4469	Gas @ 4357-4460	Gas @ 3360-3522	
QUEENSTON	4304-	4203-	4346-	4492-	4289-	4480-	4556-	4454-	4446-	3504-	
QUEENSTON	4320-	4216-	4360-	4505-	4310-	4497-	4579-	4473-	4464-	3524-	
TOTAL DEPTH	4404	4292	4434	4565	4331	4546	4642	4530	4503	3632	
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	330 Mcf AF 1,050 psi/72 hrs extension Brokenstraw field	300 Mcf AF 950 psi/72 hrs development Spencer Creek pool Corry field	300 Mcf AF 1,100 psi/72 hrs extension Brokenstraw field	300 Mcf AF 1,000 psi/72 hrs development Brokenstraw field	400 Mcf AF 1,050 psi/72 hrs development Brokenstraw field	210 Mcf AF 1,020 psi/72 hrs development Brokenstraw field	300 Mcf AF 1,000 psi/72 hrs development Spencer Creek pool Corry field	300 Mcf AF 950 psi/72 hrs development Beaver Dam pool Corry field	200 Mcf AF 800 psi/72 hrs extension Beaver Dam pool Corry field	551 Mcf AF 945 psi/10 days extension Harborscreek pool North East field	

Figure 36. (Continued)

COUNTY	Permit Number	Erie 21012	Erie 21014	Erie 21017	Erie 21018	Erie 21025	Erie 21026	Erie 21027	Erie 21029	Erie 21030	Erie 21031
NAME OF WELL		William Luke #1	Millcreek #1	Robert M. Tracy et al. #3	Louis K. Bojarski #1	William & Katherine Cherry #1	Perry Fuller #1	Robert Brace #3	Blanchard Warner #1	Verle Calkins #1-A	Nora Morse #3
OPERATOR		Envirosas, Inc.	Millcreek Twp.	Mutual Oil & Gas Company #1-B-P	Mutual Oil & Gas Company #1-B-P	Northwest Natural Gas Company	Mutual Oil & Gas Company #1	Robert Brace	Appalachian Energy, Inc. #1-AE-65	Envirosas, Inc.	Envirosas, Inc.
TOWNSHIP		North East	Millcreek	McKean	McKean	Conneaut	McKean	Waterford	Wayne	Harborcreek	North East
Q. JADRANGLE & MAP NUMBER		North East C. 283 **North East E	Erie H. 146 **Shanville F	Cambridge Spgs. B. 47 **Camb. Spgs. NE A	Cambridge Spgs. B. 48 **Camb. Spgs. NE D	Graed E. 528 **Conneautville A	Cambridge Spgs. B. 49 **Camb. Spgs. NE D	Union City A. 88 **Waterford D	Corry A. 85 **Corry E	North East D. 279 **Hammelt B	North East C. 284 **North East E
LATITUDE		12,900 ft. S 41°12'30"	500 ft. S 42°05'00"	13,550 ft. S 42°00'00"	100 ft. S 41°57'30"	7,500 ft. S 41°52'30"	2,150 ft. S 41°57'30"	11,000 ft. S 41°57'30"	12,710 ft. S 41°57'30"	5,200 ft. S 42°07'30"	10,950 ft. S 42°12'30"
LONGITUDE		750 ft. W 79°47'30"	8,600 ft. W 80°07'30"	7,850 ft. W 80°05'00"	8,250 ft. W 80°05'00"	9,200 ft. W 80°20'00"	8,250 ft. W 80°05'00"	3,250 ft. W 79°57'30"	9,890 ft. W 79°40'00"	6,900 ft. W 79°55'00"	500 ft. W 79°47'30"
DATE COMPLETED		7-8-80	6-18-80	7-16-80	7-9-80	6-16-80	6-19-80	9-5-80	7-30-80	5-30-80	6-15-80
ELEVATION		1385 DF	739 DF	1390 KB	1411 KB	1080 GR	1440 KB	1215 DF	1678 DF	1280 KB	1335 DF
TULLY		1928-	1320-	*2268-	*2308-	2075-	*2380-	*2973-		1881-	1874-
ONONDAGA	LIMESTONE	2167-	1520-	2478-	2520-	2250-	2592-	2340-	3228-	2107-	2105-
	CHERT										
ONISKANY					2772-						
HELDERBERG											
KEYSER-BASS ISLAND			2896-	2741-	2781-	2506-	2853-				
SALINA				2825-	2871-	2559-	2946-				
GUELPH-LOCKPORT		2896-		3292-	3338-	3089-	3378-		2867-		2821-
	BLACK WATER										
CINTON				3557-	3616-	3328-	3664-				
	IRONDEQUOIT		2560-	3632-	3675-	3432-	3723-		3108-		3134-
MEDINA		3226-	2620-	3656-	3696-	3472-	3744-	3590-	4381-	3202-	3260-
	WHIRLPOOL	Gas @ 3253-3287	Gas @ 2620-2800	Oil @ 3683-3748	Gas @ 3724-3788	Gas @ 3785-3838	Gas @ 3785-3833	Gas @ 3636-3683	Gas @ 4478-4565	Gas @ 3208-3368	Gas @ 3205-3332
		3373-		3825-	3868-	3636-	3915-	3762-	4554-	3352-	3307-
QUEENSTON		3391-		3832-	3875-	3642-	3922-	3744-	4567-	3370-	3326-
TOTAL DEPTH		3476	2870	3960	3965	3664	3990	3800	4632	3470	3409
DEEPEST FORMATION REACHED		Queenston	Medina	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT		302 Mcf AF 925 psi/10 days development Orchard Beach pool North East field	980 Mcf AF 890 psi/4 days development Charter Oaks pool Erie field	20.7 Mcf Nat. too much fluid to obtain AF new field discov. Reeds Corners field	Open flow N/A 1,820 psi/7? development Reeds Corners field	1,500 Mcf AF 1,050 psi/48 hrs development Lundys Lane pool Conneaut field	1,360 Mcf AF 1,480 psi/48 hrs development Reeds Corners field	3,500 Mcf AF 1,065 psi/48 hrs development Waterford pool LeBoeuf field	300 Mcf AF 850 psi/72 hrs development Beaver Dam pool Corry field	450 Mcf AF 975 psi/10 days development Harborcreek pool North East field	367 Mcf AF 860 psi/10 days extension Orchard Beach pool North East field

COUNTY	Permit Number	Erie 21032	Erie 21033	Erie 21036	Erie 21038	Erie 21041	Erie 21042	Erie 21043	Erie 21045	Erie 21053	Erie 21055
NAME OF WELL	Nora Morse #4	Nora Morse #5	Clyde Burnham #4	Harry & Richard Seidel #1	Laura Schultz #1	Leo Merski #1	Fairview I 7	Fairview I 7	Glenn Arnold #1	Wayne Wilson #1	Clifford Schultz #1
OPERATOR	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Great Lakes Hydrogas, Inc.	Envirogas, Inc.	Vineyard Oil & Gas Company	Great Lakes Hydrogas, Inc.	Great Lakes Hydrogas, Inc.	Envirogas, Inc.	Appalachian Energy, Inc. AE-132	Envirogas, Inc.
TOWNSHIP	North East	North East	North East	Franklin	North East	North East	Harborcreek	Fairview	North East	Wayne	North East
QUADRANGLE & MAP NUMBER	North East C 285 **North East E	North East C 300 **North East E	North East B 286 **North East D	Cambidge Spgs A 57 **Edinboro N E	North East B 287 **Harborcreek F	North East B 301 **Harborcreek F	Fairview I 7 **Fairview I	Fairview I 7 **Fairview I	North East E 288 **North East H	Corry A 84 **Corry D	North East F 289 **North East H
LATITUDE	9,750 ft. S 42°12'30"	8,550 ft. S 42°12'30"	11,500 ft. S 42°12'30"	11,700 ft. S 41°57'30"	13,400 ft. S 42°12'30"	6,200 ft. S 42°12'30"	3,700 ft. S 42°02'30"	3,700 ft. S 42°10'00"	1,700 ft. S 42°10'00"	9,750 ft. S 41°57'30"	350 ft. S 42°10'00"
LONGITUDE	2,150 ft. W 79°47'30"	750 ft. W 79°47'30"	3,000 ft. W 79°50'00"	5,700 ft. W 80°10'00"	3,950 ft. W 79°52'30"	8,050 ft. W 79°52'30"	200 ft. W 80°15'00"	2,000 ft. W 79°47'30"	2,000 ft. W 79°47'30"	2,900 ft. W 79°42'30"	350 ft. W 79°47'30"
DATE COMPLETED	8-1-80	8-27-80	7-18-80	6-16-80	6-19-80	6-23-80	6-22-80	7-14-80	7-24-80	7-24-80	7-22-80
ELEVATION	1244 DF	1234 DF	1194 DF	1300 DF	945 GR	739 DF	000 GR	1360 DF	1548 DF	1425 DF	
TULLY	1778-	1773-	1720-	2220-	1459-	1263-		1910-		1986-	
ONONDAGA	2015-	2000-	1943-	2404-	1682-	1421-		2148-		2224-	
CHERT											
ORISKANY											
HELOERBERG											
KEYSER-BASS ISLAND											
SALINA											
GUELPH-LOCKPORT	2719-	2708-	2663-	2663-	2388-	2220-	2220-	2877-			2948-
BLACK WATER											
CLINTON	2985-	2969-	2923-	2923-	2652-	2370-	2370-	3142-			3208-
IRONOQUOIT	3036-	3020-	2975-	3506-	2699-	2441-	2441-	3192-			3264-
MEADINA	3066-	3045-	2999-	3598-	2724-	2460-	2460-	3218-			3244-
WHIRLPOOL	Gas @ 3066-3163 3210-	Gas @ 3070-3206 3183-	Gas @ 3021-3065 3149-	Gas @ 3627-3676 3750-	Gas @ 2748-2894 2075-	Gas @ 2476-2626 2614-	Gas @ 2732 & 2882 2864-	Gas @ 3241-3836 3362-	4228- Gas @ 4265-4371 4356-		3438-
QUEENSTON	3226-	3209-	3168-	3771-	2896-	2624-	2890-	3382-		4374-	3454-
TOTAL DEPTH	3317	3300	3263	3795	2997	2687	2952	3478		4430	3534
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	780 Mcf AF 930 psi/10 days development Onchard Beach pool North East field	213 Mcf AF 960 psi/10 days development Orchard Beach pool North East field	3,100 Mcf AF 825 psi/10 days development Burgess pool North East field	627 Mcf AF 1,080 psi/6 hrs new field discovery Franklin Center field	78 Mcf AF 1,100 psi/10 days development Burgess pool North East field	1,237 Mcf AF 750 psi/66 hrs development Burgess pool North East field	427 Mcf Nat. 365 psi/1 1/2 hrs extension Fairview pool Erie field	1,900 Mcf AF 1,100 psi/10 days extension Bull Reservoir pool North East field	375 Mcf AF 1,075 psi/72 hrs development Beaver Dam pool Corry field	780 Mcf AF 1,010 psi/10 day development Bull Reservoir pool North East field	

Figure 36. (Continued)

COUNTY	Permit Number	Erie 21059	Erie 21060	Erie 21077	Erie 21082	Erie 21087	Erie 21088	Erie 21089	Erie 21090	Erie 21096	Erie 21109
NAME OF WELL	George Schoenfeldt #1	George Schoenfeldt #2	Adam Ozestekiewicz #1	Clifford Post #1	Eugene Findley #1	North East Borough #1	North East Borough #1	Frances Barnhart #1	Cecil & Doris Robb #1	Henry Flak #1	Harold Glover #1
OPERATOR	Envirogas, Inc.	Envirogas, Inc.	Mutual Oil & Gas Company M-10-P	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Vineyard Oil & Gas Company	Northwest Natural Gas Company	Mutual Oil & Gas Company M-11-P	Envirogas, Inc.
TOWNSHIP	North East	North East	McKean	North East	North East	North East	Greenfield	North East	Conneaut	McKean	North East
QUADRANGLE & MAP NUMBER	North East F 290 **North East F	North East F 291 **North East F	Cambridge Spgs B 50 **Camb Spgs NE D	North East F 292 **North East H	North East C 293 **North East E	North East F 294 **North East I	North East F 294 **North East I	North East B 296 **North East D	Girard E 529 **Conneautville A	Cambridge Spgs A 51 **Camb Spgs NE A	North East F 302 **North East I
LATITUDE	12,900 ft. S 42°12'30"	14,700 ft. S 42°12'30"	1,050 ft. S 41°57'30"	3,500 ft. S 42°10'00"	7,340 ft. S 42°12'30"	4,630 ft. S 42°10'00"	4,630 ft. S 42°10'00"	5,050 ft. S 42°12'30"	5,100 ft. S 41°52'30"	14,100 ft. S 42°00'00"	1,800 ft. S 42°10'00"
LONGITUDE	10,250 ft. W 79°45'00"	10,050 ft. W 79°45'00"	1,000 ft. W 80°05'00"	2,250 ft. W 79°47'30"	2,020 ft. W 79°47'30"	10,290 ft. W 79°45'00"	10,290 ft. W 79°45'00"	10,200 ft. W 79°50'00"	8,750 ft. W 80°20'00"	5,550 ft. W 80°05'00"	10,100 ft. W 79°45'00"
DATE COMPLETED	7-28-80	7-27-80	5-28-80	8-3-80	8-15-80	8-12-80	8-12-80	8-11-80	8-6-80	8-13-80	9-2-80
ELEVATION	1,370 GR	1430 DF	1490 KB	1410 DF	1174 DF	1480 DF	1480 DF	805 DF	1050 GR	1420 KB	1430 KB
TRAIL	1942-	2010-	*2396-	1941-	1712-	2074-	2074-	1270-	2015-	*2360-	2011-
ONONDAGA	2182-	2252-	2612-	2233-	1947-	2322-	2322-	1425-	2190-	2576-	2257-
CHERT											
ONISKANY											
HELDERBERG			2813-								
KEYSER-BASS ISLAND			2852-						2446-	2847-	
SULLINA			2804-						2528-	2923-	
GUELPH-LOCKPORT	2891-	2966-	3428-	2957-	2646-	3036-	3036-	2285-	3033-	3358-	2972-
BLACK WATER											
CANTON	3150-	3232-	3710-	3226-	2926-	3309-	3309-	2340-	3301-	3643-	3232-
IRONDEQUOIT	3202-	3278-	3767-	3270-	2962-	3354-	3354-	2510-	3388-	3695-	3286-
MEDINA	3234-	3314-	3790-	3297-	2992-	3388-	3388-	2526-	3415-	3716-	3313-
WHIRLPOOL	Gas @ 3260-3391 3375-	Gas @ 3326-3420 3451-	Gas @ 3831-3878 3961-	Gas @ 3327-3455 3442-	Gas @ 2993-3149 3135-	Gas @ 3403-3541 3528-	Gas @ 3403-3541 3528-	Gas @ 2509-2699 2690-	Gas @ 3452-3503 3594-	Gas @ 3753-3806 3807-	Gas @ 3381-3415 3462-
QUEENSTON	3393-	3466-	3970-	3459-	3152-	3544-	3544-	2704-	3598-	3894-	3477-
TOTAL DEPTH	3498	3518	4044	3535	3252	3636	3636	2750	3605	4050	3561
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULT	681 Mcf AF 995 psi/10 days development Orchard Beach pool North East field	304 Mcf AF 1,025 psi/10 days development Bull Reservoir pool North East field	115 Mcf Nat. 1,525 Mcf AF 1,050 psi/48 hrs extension Reeds Corners field	2,500 Mcf AF 1,025 psi/10 days development Bull Reservoir pool North East field	304 Mcf AF 830 psi/10 days extension Orchard Beach pool North East field	304 Mcf AF 830 psi/10 days extension Orchard Beach pool North East field	2,000 Mcf AF 1,010 psi/10 days extension Bull Reservoir pool North East field	150 Mcf AF 880 psi/4 days development Burgess pool North East field	1,000 Mcf AF 1,070 psi/48 hrs development Lundys Lane pool Conneaut field	21 Mcf Nat. 1,175 Mcf AF 1,050 psi/48 hrs development Reeds Corners field	24 Mcf AF 985 psi/10 days development Bull Reservoir pool North East field

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Erie 21110	Erie 21111	Erie 21120	Erie 21146	Erie 21149	Erie 21152	Fayette 20245	Fayette 20251	Forest 22185-0	Indiana 25073
NAME OF WELL	Harold McIntyre #1	Guenther Martens #1	North East Hunting & Fishing Club #1	North East Hunting & Fishing Club #1	Robert Thornton #1	North East School District #1	Walter Kosinski #3	Kitty H. Smith #1	Anna Marunyak #1	Lot 5200 QW-0001	Glenn E. McCall #5
OPERATOR	Envirogas, Inc.	Vineyard Oil & Gas Company	Envirogas, Inc.	Envirogas, Inc.	Envirogas, Inc.	Vineyard Oil & Gas Company	Mutual Oil & Gas Company M-16-P	Fortuna Energy Corporation	Amoco Production/Ashtola Produc.	John A. Vertullo	Angerman Gas Venture
TOWNSHIP	North East	Waterford	Greenfield	Greenfield	North East	North East	McKean	Henry Clay	Georges	Hickory	White
QUADRANGLE & MAP NUMBER	North East C 303 **North East F	Union City A 89 **Waterford 0	North East F 305 **North East H	North East F 305 **North East H	North East B 306 **North East D	North East C 307 **North East B	Cambridge Spgs B 52 **Camb Spgs NE A	Confluence G 16 **Oniophyle D	Masonville F 2 **Smithfield B	Tidoute E 12 **Kellettsville A	Indiana G 31 **Indiana E
LATITUDE	13,250 ft. S 42°12'30"	14,250 ft. S 41°57'30"	5,130 ft. S 42°10'00"	5,130 ft. S 42°10'00"	3,410 ft. S 42°12'30"	8,600 ft. S 42°15'00"	12,200 ft. S 42°00'00"	7,450 ft. W 39°50'00"	10,400 ft. S 39°52'30"	14,750 ft. S 41°37'30"	1,600 ft. S 40°35'00"
LONGITUDE	8,550 ft. W 79°45'00"	4,450 ft. W 79°57'30"	2,700 ft. W 79°47'30"	2,700 ft. W 79°47'30"	7,290 ft. W 79°50'00"	10,450 ft. W 79°47'30"	1,350 ft. W 80°05'00"	550 ft. W 79°27'30"	10,425 ft. W 79°47'30"	2,000 ft. W 79°20'00"	5,350 ft. W 79°10'00"
DATE COMPLETED	8-17-80	8-17-80	9-10-80	9-10-80	9-30-80	10-10-80	10-3-80	10-1-79	11-22-79	3-8-79	11-24-79
ELEVATION	1385 KB	1174 OF	1435 KB	1435 KB	804 OF	769 OF	1510 KB	2837 KB	1243 KB	1295 GR	1533 KB
TULLY	1961-	2202-	2025-	2025-	1270-	1264-	2390-	Marcellus @ 8090-	7405-	3998-	7597-
ONONDAGA	2196-	2428-	2265-	2265-	1499-	1419-	2598-	8257- Gas @ 8303-8394 8277-	7796- 7817-	4312-	
ORISKANY								8473-	7994-	4364-	
HELDERBERG										4380-	
KEYSER-BASS ISLAND SALINA										4512-	
GUELPH-LOCKPORT BLACK WATER	2906-	3312-	2993-	2993-	2200-	2179-				5300-	
CLINTON	3163-	3520-	3253-	3253-	2456-	2242-				5738-	
IRONDEQUOIT	3219-		3310-	3310-	2510-	2404-				5768- SG @ 5850	
MEDINA	3244- Gas @ 3277-3406 3390-	3682- Gas @ 3719-3856 3848-	3335- Gas @ 3361-3496 3480-	3335- Gas @ 3361-3496 3480-	2534- Gas @ 2560-2698 2682-	2420- Gas @ 2481-2589 2577-					
WHIRLPOOL											
QUEENSTON	3410-	3860-	3500-	3500-	2702-	2594-				5936-	
TOTAL DEPTH	3481	3958	3574	3574	2804	2640	2887	8609	8628	5936	8015
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Onondaga	Oriskany	Helderberg	Queenston	Tully
RESULT	196 Mcf AF 960 psi/170 days development Orchard Beach pool North East field	212 Mcf AF 1,182 psi/4 days development Waterford pool LeBoeuf field	1,300 Mcf AF 1,000 psi/170 days development 8u11 Reservoir pool North East field	1,300 Mcf AF 1,000 psi/170 days development 8u11 Reservoir pool North East field	1,300 Mcf AF 835 psi/77 days development Orchard Beach pool North East field	725 Mcf AF 798 psi/77 days development Orchard Beach pool North East field	Ory and abandoned extension Reeds Corners field	60 Mcf Nat. 56 Mcf AF 2,895 psi/72 hrs extension Oniophyle field	Ory and abandoned woodside pool Highhouse field	Drilled deeper dry and abandoned deeper pool test East Hickory field	1,163 Mcf AF 1,075 psi/6 days well plugged back to 4100 feet Shallow producer Indiana field

Figure 36. (Continued)

COUNTY	Permit Number	Indiana 25151	Indiana 25437	Indiana 25611	Lawrence 20022	Mckean 37291	Mercer 20182	Mercer 20186	Northumberland 20002	Potter 20569-P	Somerset 20071
NAME OF WELL	Barbara Anderson #1	Consolidated Gas Supply Corp. MN-1767	T. M. Berringer #1	W. A. Schroth #1	Connie Sokevit #1	Minard Run Oil Company #1	Emma Dallas #1	Joseph Eagles #6224	Withour Gas Unit #1	Masonite	Commonwealth of Pennsylvania Tract 111-A
OPERATOR	Consolidated Gas Supply Corp. MN-1767	Consolidated Gas Supply Corp. MN-1791	Consolidated Gas Supply Corp. MN-1791	Felmont Oil Corp. F-273	Peoples Natural Gas Company #5454	Minard Run Exploration Co.	Cyclops Corp.	National Fuel Gas Supply Corp.	Amoco Production Company	Meridian Exploration Corporation	Amoco Production/UGI Corporation
TOWNSHIP	Green	Pine	Pine	Green	Wilmington	Lafayette	South Pymatuning	North	Shanokin	Ulysses	Lower Turkey Foot
QUADRANGLE & MAP NUMBER	Barnesboro C 43 **Barnesboro B	Barnesboro H 44 **Strongtown F	Barnesboro E 45 **Commodore I	Nashonock F 9 **New Castle R. C	Bradford E 14 **Cyclone A	Kingsan I 30 **Orangeville I	Stoneboro I 22 **Sandy Lake I	Stoneboro I 22 **Sandy Lake I	Shamokin B 4 **Trevorton B	Conesee F 185 **Brookland B	Confluence E 15 **Kingwood G
LATITUDE	13, 200 ft. S 40°45'00"	9,950 ft. S 40°35'00"	6,110 ft. S 40°40'00"	12,020 ft. S 41°07'30"	2,250 ft. S 41°52'30"	4,600 ft. S 41°17'30"	4,000 ft. S 41°17'30"	4,000 ft. S 41°17'30"	5,400 ft. S 40°52'30"	10,300 ft. S 41°52'30"	4,350 ft. S 39°55'00"
LONGITUDE	9,100 ft. W 78°47'30"	11,350 ft. W 78°52'30"	5,700 ft. W 78°52'30"	8,800 ft. W 80°15'00"	8,000 ft. W 78°35'00"	1,200 ft. W 80°30'00"	10,175 ft. W 80°00'00"	10,175 ft. W 80°00'00"	2,100 ft. W 76°40'00"	6,000 ft. W 77°47'30"	5,400 ft. W 79°20'00"
DATE COMPLETED	2-21-80	4-28-80	9-10-80	12-14-79	3-16-79	9-19-79	10-17-79	10-17-79	3-29-80	7-6-79	10-23-78
ELEVATION	1704 KB	1886 GR	1722 KB	1081 KB	2260 GR	1064 GR	1417 KB	1417 KB	750 GR	2184 KB	2403 GR
TULLY											
ONONDAGA LIMESTONE	8226- Gas @ 8248-8279 8238-	8307- Gas @ 8336-8352 8324-	8113- Gas @ 8139-8227 8124-	4131- 4173-							
CHERT											
ORISKANY	8324-	8420-	8222-								
HELDERBERG	8352-		8254-								
KEYSER-BASS ISLAND											
SALINA											
GUELPH-LOCKPORT											
BLACK WATER											
CLINTON											
IRONDEQUIT											
MEDINA											
WHIRLPOOL											
QUEENSTON											
TOTAL DEPTH	8459	8678	8341	4203	5208	5110	5559	5559	14,737	5016	8278
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Helderberg	Onondaga	Onondaga	Onondaga	Queenston	Clinton	Cambro-Ordovician	Helderberg	Oriskany
RESULT	1,007 Mcf AF 4,225 psi/14 days deeper pool Untown pool Living Waters field	146 Mcf Nat. 424 Mcf AF 3,600 psi/48 hrs new pool discovery Carney Run pool Nolo field	353 Mcf AF 3,530 psi/72 hrs development Lizowitz pool Strongtown field	Hamilton @ 4008- Marcellus @ 4060- 133 Mcf AF 1,370 psi/30 days new field discov Mehannock Creek field	Junked @ abandoned deeper pool test Marcellus shale core well Bradford field	1,500 Mcf AF 1,450 psi/66 hrs development Sharon Deep pool Sharon field	220 Mcf Nat. 1,966 psi/12 days extension Kilgore pool Wolf Creek field	50 Mcf AF 250 psi/48 hrs abandoned development Ulysses field	Dry and abandoned new field wildcat well not treated	Dry and abandoned new field wildcat	Dry and abandoned new field wildcat

SUMMARIZED RECORDS OF DEEP WELLS

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COUNTY	Permit Number	Somerset 20074	Somerset 20076	Somerset 20079	Somerset 20083	Somerset 20084	Somerset 20085	Somerset 20086	Somerset 20087	Somerset 20089	Somerset 20090
NAME OF WELL	James W. Crawford Gas Unit #1	Glenn R. Miller Gas Unit #1	Glenn Stutzman Gas Unit #1	Levi Berkley Gas Unit #1	Pyle-Zimmerman Gas Unit #1	Wilbur Z. Snyder #1	Matthew B. Luce Gas Unit #1	Theodore C. Sipe Gas Unit #1	D. D. Shaffer Gas Unit #1	Robert M. Frazee Gas Unit #1	
OPERATOR	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	
TOWNSHIP	Milford	Jefferson	Stonycreek	Somerset	Somerset	Somerset	Black	Milford	Shade	Milford	
QUADRANGLE & MAP NUMBER	Myersdale B 12 **Murdock D	Somerset G 40 **Bakersville H	Windber G 12 **Stoystown H	Somerset I 41 **Somerset H	Myersdale C 15 **Murdock B	Myersdale B 13 **Murdock D	Myersdale A 17 **Rockwood E	Myersdale A 14 **Rockwood E	Windber E 15 **Windber G	Myersdale B 17 **Murdock D	
LATITUDE	6,300 ft. S 39°57'30"	6,800 ft. S 40°02'30"	8,530 ft. S 40°02'30"	900 ft. S 40°02'30"	4,500 ft. S 40°00'00"	12,500 ft. S 39°57'30"	12,050 ft. S 40°00'00"	5,750 ft. S 39°57'30"	9,950 ft. S 40°10'00"	105 ft. S 39°57'30"	
LONGITUDE	10,250 ft. W 79°05'00"	5,050 ft. W 79°10'00"	10,480 ft. W 78°55'00"	4,600 ft. W 79°02'30"	10,150 ft. W 79°02'30"	9,900 ft. W 79°05'00"	6,700 ft. W 79°10'00"	2,250 ft. W 79°10'00"	7,150 ft. W 78°50'00"	6,250 ft. W 79°05'00"	
DATE COMPLETED	3-22-79	6-12-79	7-13-79	10-7-79	8-7-79	10-3-79	8-5-79	9-16-79	3-12-80	10-31-79	
ELEVATION	1873 KB	2056 KB	2449 KB	2181 KB	2153 KB	2137 KB	2178 KB	2097 KB	2422 KB	2015 KB	
TULLY	*7672-	7650-	*7672-	7996-	*8127-	7855-	8072-	8968-	7858-	7851-	
ONONDAGA	8573-	8346-	8614-	8822-	9078-	8737-	8933-	8694-	8836-	8717-	
CHERT		8416-	8640-	8843-	9102-	8760-	8957-	8711-	8868-	8736-	
CRISKANY	8710- Gas @ 8712-8841	8538- Gas @ 8540-8629	8716- Gas @ 8742-8822	8950- Gas @ 8951-9047	9202-	8764- Gas @ 8881-9130	9100-	8825-	8947-	8838- Gas @ 8839-8960	
HELDERBERG	8919-	8679-	8750-		9250-		9260-	8950-	9054-		
KEYSER-BASS ISLAND											
SALINA											
GUELPH-LOCKPORT											
BLACK WATER											
CLINTON											
IRONDEQUOIT											
NEDINA											
WHIRLPOOL											
QUEENSTON											
TOTAL DEPTH	8949	8727	8919	9151	9333	9130	9273	8968	9142	9105	
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	Helderberg	
RESULT	2,200 Mcf Nat. 4,400 psi/72 hrs 1,100 Mcf AF 3,400 psi/42 hrs Shamrock field	600 Mcf AF RP not reported development Bakersville field	1,750 Mcf Nat. 4,100 psi/48 hrs 1,200 Mcf AF 3,400 psi/48 hrs Shanksville field	10,000 Mcf Nat. 600 psi/24 hrs 3,000 Mcf AF 3,420 psi/24 hrs new field discov. Somerset East field	Dry and abandoned development Somerset West field	Dry and abandoned development Shamrock field	1,300 Mcf Nat. 3,400 psi/48 hrs development Shamrock field	Dry and abandoned new field wildcat Rockwood field	Dry and abandoned new field wildcat	950 Mcf Nat. 3,500 psi/72 hrs 500 Mcf AF 3,500 psi/52 hrs extension Shamrock field	

Figure 36. (Continued)

COUNTY	permit Number	Somerset 20092	Somerset 20093	Somerset 20095	Somerset 20096	Somerset 20097	Somerset 20099	Somerset 20104	Venango 27187	Warren 28015	Warren 28264
NAME OF WELL	Harvey Ronesburg Gas Unit #1	Theodore C. Sipe Gas Unit #2 Well #1	Harold M. Shaulis, Jr. #1	Harold M. Shaulis, Jr. #1	Howard W. Dull Gas Unit #1	Matthew Luce Gas Unit #2	Edward G. Kriebel #1	Mae Lichty #1	Hubbard #1	John Mallery #1	Savko #1A
OPERATOR	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Amoco Production/Ashtola Produc.	Pennzoil Company	Cumberland Oil Corporation	Jennifer Petroleum, Ltd.
TOWNSHIP	Black	Milford	Milford	Milford	Shade	Milford	Paint	Black	Oil Creek	Freehold	Freehold
QUADRANGLE & MAP NUMBER	Meysdale B 18 **Rockwood F	Meysdale B 19 **Rockwood F	Meysdale A 21 **Rockwood B	Meysdale A 20 **Rockwood B	Windber E 14 **Windber G	Meysdale A 20 **Rockwood B	Windber 8 13 **Windber D	Meysdale B 22 **Rockwood F	Titusville H 5 **Pleasantville O	Youngsville B 9 **Lottsville C	Youngsville B 8 **Lottsville C
LATITUDE	11,650 ft. S 39°57'30"	6,800 ft. S 39°57'30"	100 ft. S 40°00'00"	6,975 ft. S 40°10'00"	10,000 ft. S 40°00'00"	10,920 ft. S 40°12'30"	10,920 ft. S 40°12'30"	11,600 ft. S 39°57'30"	7,400 ft. S 41°35'00"	6,400 ft. S 42°00'00"	13,450 ft. S 42°00'00"
LONGITUDE	1,500 ft. W 79°07'30"	9,700 ft. W 79°07'30"	7,500 ft. W 79°10'00"	9,000 ft. W 78°50'00"	6,300 ft. W 79°10'00"	5,400 ft. W 78°50'00"	5,400 ft. W 78°50'00"	6,200 ft. W 79°07'30"	4,560 ft. W 79°35'00"	10,600 ft. W 79°22'30"	6,800 ft. W 79°22'30"
DATE COMPLETED	1-14-80	11-26-79	7-9-80	4-1-80	5-9-80	6-6-80	9-29-80	1-3-80	8-5-80	9-5-80	9-5-80
ELEVATION	2035 KB	2139 KB	2171 KB	2247 GR	2161 KB	1948 KB	1837 GR	1624 KB	1654 KB	1774 OF	2820-
TULLY	*7848-	*7820-	7790-	7582-	7515-	3018-	2820-	3472-	3496-		
ONONDAGA	8732- 8758-	8684- 8702-	8558- 8815-	*8838-	8886- 8710-	8716- 8739-	8652- 8670-	4378- SG @ 4505			
ORISKANY	8895- Gas @ 8837-9030	8810-	8836- Gas @ 8836-8894	8924-	8834-	8919-	8860-	9015-			
HELDERBERG	9050-	8950-	8905-	9042-	8993-	8943-	9015-				
KEYSER-BASS ISLAND											
SALINA											
GUELPH-LOCKPORT											
BLACK WATER											
CLINTON											
IRONDEQUOIT											
MEDINA											
WHIRLPOOL											
QUEENSTON											
TOTAL DEPTH	9141	9019	8950	9075	9071	8995	9065	4505	4800	4970	4970
DEEPEST FORMATION REACHED	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Holderberg	Onondaga	Queenston	Queenston
RESULT	200 Mcf AF 3,500 psi/72 hrs development Shamrock field	150 Mcf Nat & AF 3,720 psi (est.) shallow pool (Onondaga) discov Gebhart pool Rockwood field	500 Mcf AF 2,290 psi/14 days extension Bakersville field	Dry and abandoned extension Shade Creek field	Dry and abandoned extension Shade Creek field	Dry and abandoned extension Shade Creek field	Dry and abandoned extension Shade Creek field	Dry and abandoned development Shamrock field	Dry and abandoned deeper pool test Pleasantville field	550 Mcf AF 1,180 psi/? new pool discovery Freehold pool Stillwater field	396 Mcf AF 500 psi/48 hrs new pool discovery Savko pool Stillwater field

COUNTY	Permit Number	Westmoreland 21477	Westmoreland 21557	Westmoreland 21682						
NAME OF WELL	Mellon Bank, N. A. #1	Constance Prosser Burrell #2	Forbes-Carr #2							
OPERATOR	Peoples Natural Gas Company #5359	Peoples Natural Gas Company #5441	Ter-Ex, Inc.							
TOWNSHIP	Ligonier	Fairfield	Unity							
QUADRANGLE & MAP NUMBER	Somerset 0 39 **Ligonier G	New Florence H 22 **Rachelwood G	Latrobe E 29 **Latrobe C							
LATITUDE	2,200 ft. S 40°10'00"	4,550 ft. S 40°17'30"	7,500 ft. S 40°22'30"							
LONGITUDE	1,250 ft. W 79°12'30"	3,175 ft. W 79°05'00"	9,800 ft. W 79°22'30"							
DATE COMPLETED	4-25-79	10-19-79	7-10-80							
ELEVATION	2191 XB	2266 XB	1160 XB							
TULLY	*7135-	*7020-	6882-							
ONONDAGA	LIMESTONE	7780-	7411-							
	CHERT	7790-	7429- Gas							
ORISKANY	7920- Gas @ 7934-795D	8024-	7581- Gas							
HELDERBERG	7990-	8100-	7620- Gas							
KEYSER-BASS ISLAND		8320-								
SALINA										
GUELPH-LOCKPORT										
BLACK WATER										
CLINTON										
IRONDEQUOIT										
MEDINA										
WHIRLPOOL										
DUEENSTON										
TOTAL DEPTH	8120	8477	7640							
DEEPEST FORMATION REACHED	Helderberg	Keyser-Bass Island	Helderberg							
RESULT	3,400 Mcf Nat. 7,000 Mcf AF 3,050 psi/48 hrs new field discovery Linn Run field	Dry and abandoned new pool wildcat Johnstown field	400 Mcf AF 3,150 psi/48 hrs extension Dry Ridge pool Crabtree field							

